

20TH BIRTHDAY COLLECTOR'S E

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Australian Personal Computer

ISSN - 0725-4415 NZ \$9.95

AUSTRALIA'S LEADING COMPUTER MAGAZINE

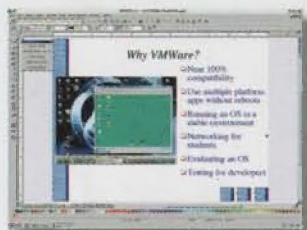
May 2000

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SPECIAL 16-PAGE S

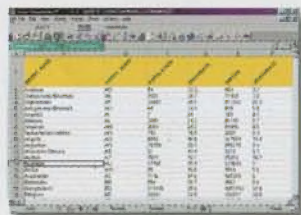
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Sun StarOffice

FULL VERSION

Sun's StarOffice is a comprehensive, multiplatform office suite containing applications for word processing, spreadsheets, presentations and more. This month's cover CD includes fully functional versions for Windows, Linux, OS/2 and Solaris platforms.



Lotus 1-2-3 97

**FULL VERSION
+ \$100 UPGRADE OFFER**

One of the first killer applications for the PC, Lotus 1-2-3 remains one of the best spreadsheets available today. We've got the full commercial version of Lotus 1-2-3 97, not crippled or time-bombed in any way. Lotus is also offering APC readers a discount upgrade opportunity that could save you \$100.



Xara3D

**FULL VERSION
+ \$48 UPGRADE OFFER**

Xara3D is a 'slimware' Windows application designed specifically for creating high-quality, compact 3D textual headings, either still or animated, for use on the Web. We have a full working version of Xara3D 1, and a trial version of Xara3D 3.

MP3 software

A comprehensive set of software for playing, creating and managing MP3 collections.

Products include: myCaster 1.3, Napster 2.0 Beta 5, Sonique 1.30, Winamp 2.6.1 and much more!



Instant messaging

Don't like your current instant messaging client? Try another one! To accompany this month's review, here's a complete set of messaging packages.

Products include: AOL Instant Messenger (32-bit) 3.0.1464, MSN Messenger Service 2.1.1047, PowWow (32-bit) 3.73, Yahoo Messenger 736 and more

Retro CD

Wallow in nostalgia with our selection of classic software from the past 20 years. Original and clone versions of Boulder Dash, Betrayal at Krondor and the Zork trilogy are just a few of the games you can revisit, while emulators for Amstrad, Amiga and Vectrex are also included. DOS fanatics will enjoy our selection of tools, while seven groooooovy desktop themes will soon give you retro vision. And for a taste of history, check out a complete scanned copy of APC's first issue.



GAMES DEMOS Rayman 2, Battlezone II, Killer Loop, Army Men: Toys in Space Plus New & Hot, Internet Tools, Workshop shareware archives and much more

For full CD contents, see page 8

20TH BIRTHDAY COLLECTOR'S EDITION

100% AUSTRALIAN CONTENT

Australian Personal Computer

3 CDs

ISSN - 0725-4415 NZ \$9.95 INCL. GST

AUSTRALIA'S LEADING COMPUTER MAGAZINE

May 2000 \$8.95

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Athlon faces the test

DEATH TO EMAIL

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Is Australian IT doomed?

SPEAK FOR YOURSELF

Voice recognition software tested

Telstra's \$5 billion ASP punt

Broadband finally reaches the bush

Looking back, forging ahead

*Technology's past,
present and future*

SPECIAL 16-PAGE SECTION

IN OUR BIRTHDAY TRIPLE-DISC PACKAGE

FULL VERSIONS OF

Sun StarOffice suite for
Windows, Linux and OS/2

Lotus 1-2-3 — \$100 value

Xara3D — \$48 value

Plus MP3 tools • classic games •
emulators and more!

ACP

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PLUS MORE!
See under flap

THE SOLUTION IS IN THE PROBLEM

Dell Dimension™ T Series photographed with optional extras: 17" flat panel monitor & Altec Lansing ADA 8880 Digital Surround Sound Speakers.

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Dell Dimension™ L Series
Photographed with optional 17" flat panel monitor

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- Mini Tower Model
- 256KB Advance Transfer L2 Cache
- 128MB RDRAM
- 10GB Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 3Com® Etherlink® 10/100 PCI NIC for Complete PC Management
- 32MB NVIDIA TNT2 M64 2X AGP Graphics Card
- 48X Max Variable CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
- Microsoft® Intellimouse®
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 2000
- Norton Anti-Virus 2000
- Dell QuietKey Keyboard
- Telstra Big Pond Business ISP Offer
- 3 Year Limited Warranty (With 3 Year Second Business Day On-Site Service*)
- Free Lifetime Telephone Technical Support*

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- Intel® Pentium® III Processor 600E MHz
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- 256KB Advance Transfer L2 Cache
- 64MB 100MHz SDRAM
- 10GB Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 3Com® Etherlink® 10/100 PCI NIC for Complete PC Management
- 16MB ATI RAGE 128Pro 2X AGP Graphics Card
- 48X Max Variable CD-ROM Drive
- 15" Colour Monitor (13.7" v.i.s.)
- Microsoft® Intellimouse®
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- Microsoft® Windows® 98 Second Edition
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HOW WOULD YOU DESIGN YOUR PERFECT OFFICE PARTNER

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Dell Dimension™ T Series¹ photographed with options: 17" flat panel monitor and Altec Lansing ADA 880 speakers.

1. PERSONALISED SYSTEMS

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To find out just how easy it is to put together your perfect business partner visit us online at www.dell.com.au and build systems using the custom configurator – it's easy and it's interesting. Then all you have to do is click "add to cart" or call us and we'll put together your system for you – all software is also configured to your specifications.

2. KNOW-HOW

Dell was built on listening to our customer's requirements and then fulfilling those needs. You see, it's our business to listen to you and understand exactly what your business requires.

Our experienced sales force are expertly equipped in dealing with the needs of small and expanding businesses. Every Dell staff member that you will speak to has all the

know-how about the latest and most appropriate technology for your business. So, whether you need to network an office with servers, PC's and notebooks or configure a workstation to breeze through the most challenging video applications – Dell staff are here with the answers.

3. AWARD WINNING, TAILORED SUPPORT

Readers of Australian Personal Computer voted Dell #1 for Service and Reliability in the annual awards⁵ and all Dell support packages are tailored to your needs. So the personalised treatment you enjoyed whilst purchasing your new Dell computer extends into our after sales service. All Dell systems come with Free Lifetime Technical Support or you can choose the level of support you want – such as upgrading to a three year onsite warranty.

Now, doesn't Dell sound like the perfect business partner!

DELL DIMENSION™ DESKTOPS

DELL DIMENSION™ XPS B866R DESKTOP

- Intel® Pentium® III Processor 866MHz
- Micro Tower Model
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- 128MB RDRAM
- 20.4GB Ultra ATA Hard Drive (7200rpm)
- 3.5" 1.44MB Diskette Drive
- 64MB DDR NVIDIA GeForce 4X AGP Graphics Card
- SoundBlaster Live! Value 576Voice Sound Card
- 12X Max Variable DVD-ROM Drive and Software Decoding
- 8X Sony CDRW with formatted media
- Altec Lansing ACS-340 Speakers with Subwoofer
- 19" Trinitron Monitor (18.0" v.i.s.)
- Logitech 4-button MouseMan® Wheel (PS/2V)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 2000
- Norton Anti-Virus 2000
- Conexant® V.90/56K PCI Telephony Modem for Windows
- Microsoft® Natural® Pro, Dell Edition
- Microsoft® Natural® Keyboard Pro, Dell Edition
- Telstra Big Pond Home ISP Offer
- PowerGame Pack II
- 3 Year Limited Warranty
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Dell recommended upgrade options:

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- Store information on CDs - add a Sony CD-RW \$390

DELL DIMENSION™ XPS B733R DESKTOP

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- Mini Tower Model
- 256KB Advance Transfer L2 Cache
- 128MB RDRAM
- 15GB Ultra ATA Hard Drive
- 3.5" 1.44MB Diskette Drive
- 32MB Diamond Ultra TNT2 V770U 4X AGP Graphics Card
- Turtle Beach Montego II 320Voice PCI Sound Card
- 48X Max Variable CD-ROM Drive
- Altec Lansing ACS-340 Speakers with Subwoofer.
- 17" Colour Monitor (15.9" v.i.s.)
- Logitech 4-button MouseMan® Wheel (PS/2V)
- Microsoft® Windows® 98 Second Edition
- Microsoft® OEM Works Suite 2000
- Norton Anti-Virus 2000
- Conexant® V.90/56K PCI Telephony Modem for Windows
- Microsoft® Natural® Pro, Dell Edition
- Telstra Big Pond Home ISP Offer
- PowerGame Pack II
- 3-Year Limited Warranty
- Free Lifetime Telephone Technical Support²

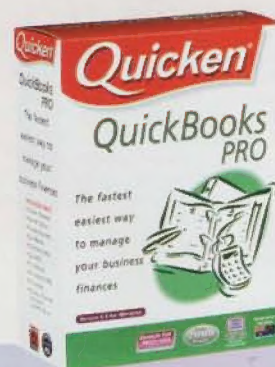
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DELLWARE



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- Intel® Pentium® III Processor 533EB MHz (Dual Processor Capable)
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- Free Lifetime Telephone Technical Support†

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- VALUE WORKGROUP SERVER
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- 512KB Internal L2 Cache
- 64MB 100MHz SDRAM With ECC (Upgradeable to 1GB)
- 9GB LVD SCSI Hard Drive
- 3.5" 1.44MB Diskette Drive
- Standard Intel Pro 100+ NIC
- Integrated Ultra2/LVD SCSI Controller
- 40X Max Variable EIDE CD-ROM Drive
- Dell Mouse
- Standard Openview Network Node Manager S.E.
- 3 Year Limited Warranty (with 1 Year Next Business Day On-Site Service)*
- Free Lifetime Telephone Technical Support†

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- 128MB PC600 400MHz RDRAM with ECC
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- Integrated Dual ATA-66 EIDE Controller
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- 48X Max Variable EIDE CD-ROM Drive
- 17" Colour Monitor (15.9" v.l.s.)
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Dell recommended upgrade Options:

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- Additional 9GB LVD SCSI Hard Drive \$780

Dell recommended upgrade Options:

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- Expand storage capacity with an additional 9GB LVD SCSI Hard Drive \$780



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- Intel® Pentium® III Processor 500MHz
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- 24X Max Variable CD-ROM Drive
- with 3.5" 1.44MB Diskette Drive (Modular Combo)
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- 6.0GB Ultra ATA Hard Drive
- 3Com® 10/100 LAN CardBus PC Card
- 8MB ATI RAGE Mobility™ - P 2X AGP Video Controller
- 3.5" 1.44MB Diskette Drive
- High-fidelity Audio SoundBlaster Compatible
- 24X Max Variable CD-ROM Drive
- 14.1" XGA Colour TFT Display
- Microsoft® Windows 98 Second Edition
- Microsoft® OEM Office 2000 Small Business Edition
- Deluxe Carrying Case
- 3-Year Limited Warranty (with 3-Year Collect & Return Response)*
- Free Lifetime Telephone Technical Support†

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- On-Die 128KB L2 Cache
- 32MB SDRAM
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- 8MB ATI Mobility M1™ 2X AGP Video Controller
- 3.5" 1.44MB Diskette Drive
- High-fidelity Audio SoundBlaster Compatible
- 24X Max Variable CD-ROM Drive
- 14.1" XGA Colour TFT Display
- Microsoft® Windows® 98 Second Edition
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- Free Lifetime Telephone Technical Support†

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Dell recommended upgrade options:

- Expand storage capacity with an 18GB Ultra ATA Hard Drive \$878
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Dell recommended upgrade options:

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INDIVIDUAL



Dell Inspiron™ 3800. Pictured in Sierra Marone

At Dell we piece each notebook together individually. It doesn't get any more personal than a notebook, and at Dell you can custom configure our Inspiron range of notebooks to meet your needs.

The new Dell Inspiron™ 3800 range is lightweight, competitively priced, and available in an exciting range of colours: Forest Green, Sierra Marone, Tahoe Blue, Storm Grey. For something really lightweight and slim-line (3.6cm thick) the Dell Inspiron™ 5000 range of notebooks offer the perfect combination of price, power and mobility.

If you're looking for power don't miss the Inspiron™ 7500 range. Delivering more raw power than many desktops and featuring Intel Pentium III processors with speeds up to 700MHz and as well as giant 15.4" screens, perfect for presentations on the road.

Made to order technology solutions for individuals and their businesses.



Dell Inspiron™ 3800
pictured in Forest Green

DELL INSPIRON™ 7500 R650YT NOTEBOOK

- Mobile Intel® Pentium® III Processor 650MHz featuring Intel Speedstep™ technology
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- 256MB (2x128) 100MHz SDRAM
- 18GB¹ Ultra ATA Hard Drive
- RealPort CardBus Ethernet 10/100 & Modem 56 (32Bit)
- 8MB ATI RAGE Mobility™ - P 2X AGP Video Controller
- High-fidelity Audio SoundBlaster Compatible
- 24X Max Variable CD-ROM Drive with 3.5" 1.44MB Diskette Drive (Modular Combo)
- 15.4" SXGA Colour TFT Display
- Microsoft® Windows 98 Second Edition
- Microsoft® OEM Office 2000 Small Business Edition
- Leather Carrying Case
- 1-Year Limited Warranty (With 1-Year Collect & Return Response)¹
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Dell recommended upgrade options:

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- Store your information on CD, add a CD-RW Modular Drive with 3.5" 1.44MB Diskette Drive (Modular Combo) \$644

DELL INSPIRON™ 5000 R650LT NOTEBOOK

- Mobile Intel® Pentium® III Processor 650MHz featuring Intel Speedstep™ technology
- On-Die 256KB L2 Cache
- 128MB 100MHz SDRAM
- 12GB¹ Ultra ATA Hard Drive
- RealPort CardBus Ethernet 10/100 & Modem 56 (32Bit)
- 8MB ATI RAGE Mobility™ - P 2X AGP Video Controller
- 3.5" 1.44MB Diskette Drive
- High-fidelity Audio SoundBlaster Compatible
- 24X Max Variable CD-ROM Drive
- 15.0" XGA Colour TFT Display
- Microsoft® Windows 98 Second Edition
- Microsoft® OEM Works Suite 99
- Deluxe Carrying Case
- 3-Year Limited Warranty (With 3-Year Collect & Return Response)¹
- Free Lifetime Telephone Technical Support²

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Dell recommended upgrade options:

- Expand storage capacity to 18GB¹ Ultra ATA Hard Drive \$527
- Store your valuable information easily with an Iomega Zip 100MB Modular Drive \$293

DELL INSPIRON™ 3800 R500GT NOTEBOOK

- Intel® Pentium® III Processor 500MHz
- On-Die 256KB L2 Cache
- 32MB 100MHz SDRAM
- 4.8GB¹ Ultra ATA Hard Drive
- 3Com® 10/100 LAN CardBus PC Card
- 8MB ATI Mobility M1™ 2X AGP Video Controller
- 3.5" 1.44MB Diskette Drive
- High-fidelity Audio SoundBlaster Compatible
- 24X Max Variable CD-ROM Drive
- 14.1" XGA Colour TFT Display
- Microsoft® Windows 98 Second Edition
- Microsoft® OEM Works Suite 99
- 1-Year Limited Warranty (With International Coverage)¹
- Colour range available
- Tahoe Blue ■ Sierra Marone ■ Forest Green ■ Storm Grey
- Free Lifetime Telephone Technical Support²

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Prosignia 340 Desktop

from **\$1650***

or \$15.30 per week²

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64MB, 100MHz, SDRAM
4.3GB⁴ Ultra ATA Hard Drive⁵
Integrated 4MB AGP Display Cache
Integrated Business Audio
40X CD-ROM Drive¹
Compaq PCI V90 Modem
Creative Labs SBS 52 Speakers
Compaq Internet Keyboard
Microsoft® Windows® 98 Second Edition
Microsoft® Word 2000
S500 Colour Monitor
3 year warranty³



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TO

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Processor 533MHz –

\$1795

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Easy to set up
Easy to maintain
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Automated, removable data backup
Shared Internet and local e-mail access
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Built-in secure firewall
Support up to 100 users



Prosignia 340 Desktop

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64MB, 100MHz, SDRAM
Integrated 4MB AGP Display Cache
8.4GB⁴ Ultra ATA Hard Drive⁵
40X CD-ROM Drive¹
Integrated Business Audio
Compaq Internet Keyboard
Microsoft® Windows® 98 Second Edition
Microsoft® Word 2000
S500 Colour Monitor
3 year warranty³

UPGRADE
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NVIDIA TNT2 M64 32MB AGP Graphics
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40X CD-ROM Drive¹
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Creative Labs SBS 52 Speakers
Compaq Fast Ethernet 10/100
Compaq Internet Keyboard
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EDITORIAL



Of portals, PCs and predictions

If 20 years is a long time in publishing, it's an eternity in IT publishing. Yet exactly 20 years on, APC is still here and going strong. We are still the number one IT magazine, despite some quality competition and an industry that can turn on a dime. It is your support over the years that has kept us here, and for that, we thank you.

Our 20th anniversary is a perfect opportunity not only to gush nostalgically about computing past, but to examine the major inflection points in the brief history of personal computing. There have been many, and some that may have seemed insignificant at the time went on to make a huge impact on the industry. When IBM chose to go with Microsoft's DOS clone, for instance, it inadvertently facilitated the creation of today's most important software company. Who would have thought?

If there's anything to be learnt from the last 20 years of APC, it's that predicting the future is a tricky business. I'd be curious to investigate the graveyard of IDC reports past. I'm sure that, by now, network computers were supposed to have outstripped PCs in market capitalisation, Apple was meant to be dead, OS/2 should have taken over the world and Intel should have been the only processor vendor left.

Usually, long-term predictions have been doomed to failure in the IT industry, because there's always something that appears out of left field that destroys expectations. The hottest stories of the last few years have almost always come from the ether, and caught the world by surprise: Linux, instant messaging, MP3 — even the Internet. This is partly because those whispering in our ears are the established players. Ostensibly, they tell us 'this is the way the future will be', but in reality they're pushing a particular vision of the future that best suits their business model. The real innovations are happening in places that don't have highly paid media departments: in the computer rooms of universities, in the offices of energetic startups.

In the meantime, the established players will continue to use their economic muscle to try to control the industry. Over the next few years, I can see the biggest story being the push from the Big Companies to funnel Web consumers down a specially greased Internet carriageway, where everything is company approved and company safe. They'll try to turn you into a Sony Man or Microsoft Woman. It's a relief to know that they failed in the past, and will undoubtedly fail in the future. The broadcast thinking that dominates the companies' psyche no longer applies in a medium where content is decentralised and freedom is paramount.

Publications like APC have been in a unique position to analyse and dissect the corporate PR machine that drives these kinds of projects, something that the mainstream media historically has been incapable of doing.

But we still need your ideas to give the magazine its edge and to keep it as fresh and relevant as possible. If you have some bright ideas for making the next 20 years as successful as the last, we want to hear from you. We always welcome your feedback.

Nathan Taylor

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COVER STORY

Technology's past, present and future

20

As APC turns 20, we look back on two decades of computing and seek out trends for the future.

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Ghosts of editors past	110
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REVIEWS

MP3 HARDWARE

MP Freedom

In the past year or so, portable hardware MP3 players have come to the fore and a wide range of devices are appearing on the market. APC amassed a swag of players, including personal devices, car players and hi-fi stereo components, and then played the music.



70

Products reviewed:
Creative Nomad 64
Diamond Rio 500
DreamCom E-Sounds
jazPiper
Pine D'music

Pontis MPlayer3
Rome MP3
TerraTec M3PO
Xeonon MP Shuttle II
Editor's choice
How we tested

80

80

INSTANT MESSAGING

CHATTER BOXES

Products reviewed:
AOL Instant Messenger 3.0
ICQ 99b beta
Lotus Sametime 1.5
MSN Messenger 2.1
PowWow 4.0
Yahoo Messenger

Editor's choice 95

The Napster files 95

ICQ has long had the jump on all other instant messaging services, but new contenders seem to pop up every day. They all promise much, but how well do they deliver? APC looks at six top instant messaging services.

89

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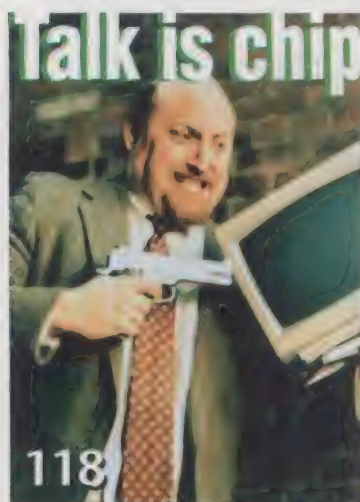
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VOICE RECOGNITION

We're still a long way from two-way conversations with our computers, but current technology allows us to tell them what to do, or have them read aloud. APC looks at three commercial voice recognition packages and three text-to-speech programs.

Voice recognition products reviewed:
 Dragon NaturallySpeaking Mobile Organiser
 IBM ViaVoice Pro Millennium Edition
 Philips FreeSpeech 2000

Text-to-speech products reviewed:
 Digalo and DigIt
 ReadPlease 2000
 Willow TALK 2.5

Editor's choice

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FEATURES

THE CLEVER COUNTRY?



Australia has always had a reputation as a technology innovator and early adopter. Is this reputation still warranted? We look at the thorny issue of exploiting our intellectual property.

113

THAT DON'T COMPRESS ME MUCH

MPEG has redefined audio and video. It is the progenitor of standards such as MP3, DVD video and digital television. APC explains how new MPEG standards will revolutionise multimedia delivery over the Net.

82



Emulation is all the craze at the moment, so APC has taken an in-depth look at the programs that enable us to enjoy the computing experience of yesteryear without dragging that old system out of the garage. We also examine the legal issues surrounding emulators.

AFTER HOURS EMULATOR SPECIAL

I wanna be just like you ...

197

Emulation and the law
 Console yourself

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Emulators reviewed:
 Amiga
 Amstrad
 Apple
 Commodore 64
 Vectrex

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PRICE WATCH
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SERVICE & RELIABILITY
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AFTER HOURS

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WEB FILE

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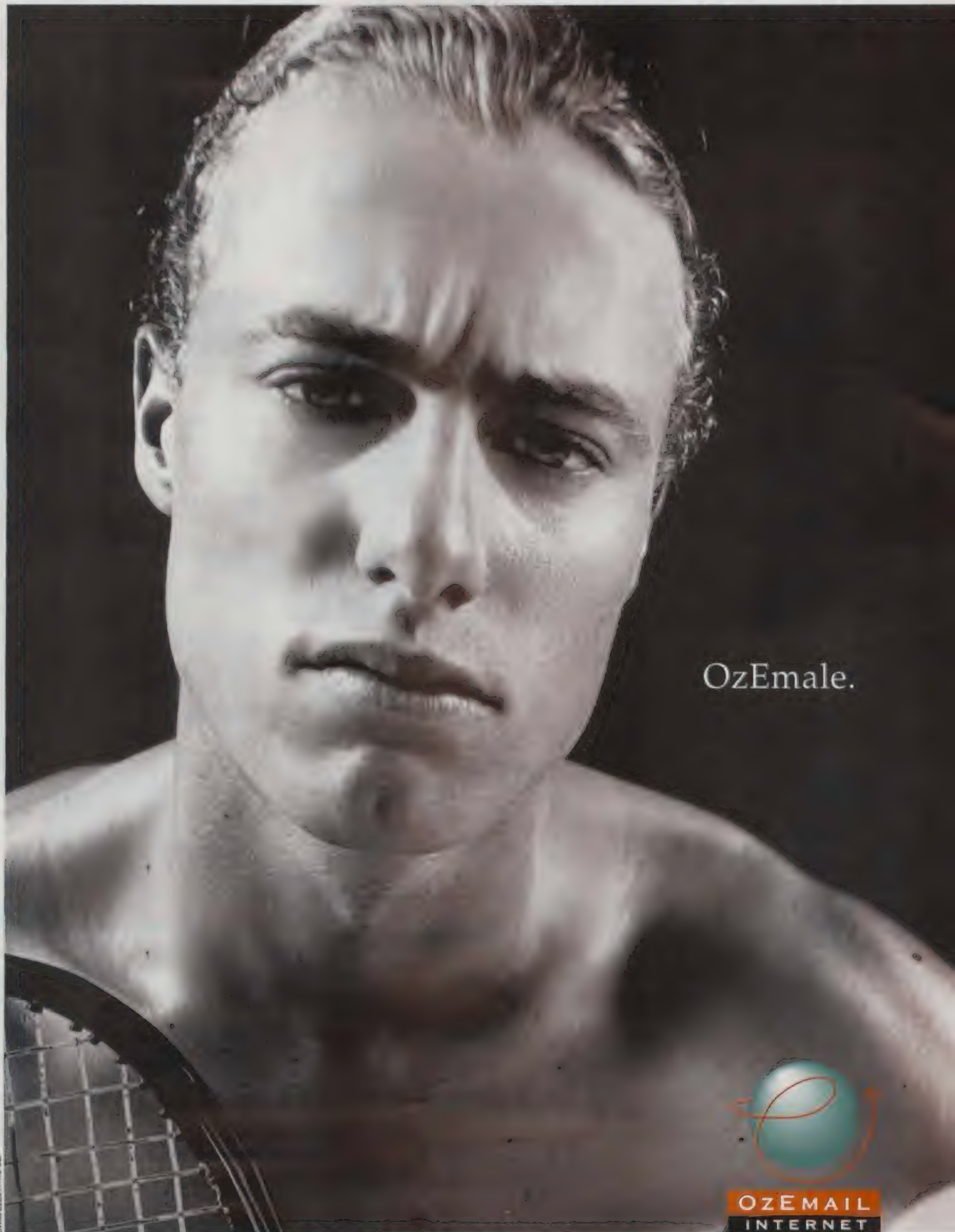
CHIP CHAT

Learn the awful truth that lurks behind a family happy snap 208

Subscription combo deal

Subscribe to APC and receive two free Pocketbooks of your choice. See page 144 to 145 for details of this amazing offer.





OzEmail.



Lleyton Hewitt. Tennis player. OzEmail user.

AUSTRALIA'S FAVOURITE

What's hot on APC's May CDs

FULL VERSION

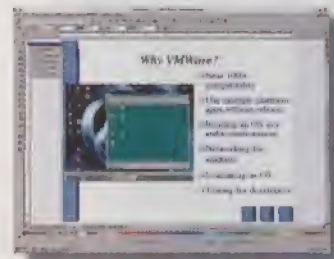
StarOffice 5.1

Sun's StarOffice is a comprehensive, multiplatform office suite containing applications for word processing, spreadsheets, presentations, HTML editing, mail and news, and even graphic design. It's designed to allow easy migration from Microsoft Office. This elegant, well-built office

suite would meet the needs of 90% of home or work environments.

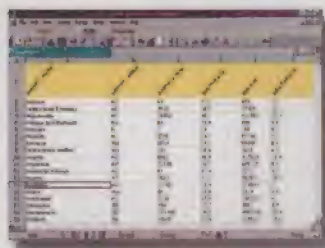
This month's cover CD disc 2 includes all the available English versions of StarOffice — complete versions. It can be installed on Windows, Linux, OS/2 or Solaris (Intel or Sparc) platforms.

The installation files can be found on disc 2 in the /feature/staroffice directory.



FULL VERSION + UPGRADE OFFER

Lotus 1-2-3 97



One of the first killer applications for the PC, Lotus 1-2-3 was released soon after the pioneering VisiCalc spreadsheet system. It remains one of the best spreadsheets available today; it is comparable with Excel in terms of features and ease of use.

This month's cover CD disc 3 contains the full commercial version of Lotus 1-2-3 97; it's not crippled or time-bombed in

any way. Lotus is also offering APC readers a unique upgrade opportunity: you can purchase the current version — Lotus 1-2-3 Millennium — for \$199, a saving of \$100.

See the CD for further details about this product and the special upgrade offer.

To install Lotus 1-2-3 97, run the file autorun.exe located on disc 3 in the /autorun directory.

FULL VERSION + UPGRADE OFFER

Xara3D

Some modern graphics applications offer more features than you would ever use, and take an age to learn and understand, but Xara3D has been created to perform one job. It's a 'slimware' Windows application designed specifically for creating high-quality, compact 3D textual headings, either still or animated, for use on the Web.

On this month's CD, APC is offering the complete version of Xara3D 1, and a trial version of Xara3D 3 with a special discount on the upgrade.

Refer to the CD for a comprehensive listing of Xara3D's features, as well as details on the upgrade offer. The installation files for Xara3D 1 and Xara3D 3 demo can be found on disc 2 in the /feature/xara directory.



Your guide to the cover CDs



apcmag.cd complements both the magazine and **apcmag.com**. Each month's disc collection features software related to articles in that issue, as well as special CD-only features and the latest Web browsers, OS patches and popular tools.

Each piece of software includes instructions on whether you will need to unzip the file before installing it, and most also include README files. A complete list of software included on this month's discs is included on the CD cover.

apcmag.cd has been created in HTML. You do not need any special software to access the discs, other than a standard browser. The CDs have been tested using Netscape Navigator 3.0 and 4.0, and Microsoft Internet Explorer 3.0 and 4.0.

All software on the CDs is provided as is, without any warranty, express or implied. Complete terms and conditions are included on the CD itself; click on the Conditions of Use link for details.

How to run the CDs

Before using the CDs, please read the Conditions of Use online at **apcmag.com/apcmag.cd**. These CDs use an Autorun feature for Windows 95, 98 and NT systems. Just insert **apcmag.cd** and your browser will automatically load with the **apcmag.cd** front page. Users of other platforms can simply launch their favourite browser and load the file DEFAULT.HTM in the root directory of the CD. For further information, see the instructions on the back cover of the CD.

You should carefully read the licensing agreements and honour any evaluation or shareware terms specified, read all instructions and README files, and virus-check every program before use.

While APC has taken every care to ensure that the software provided is useful and that it works, we cannot accept responsibility or liability for any of the products included.



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MP3 software

Looking to start your own MP3 collection? APC has all the tools you need. CD 3 includes a comprehensive set of software for playing, creating and managing MP3 collections. It includes rippers to take MP3s from CDs you own, as well as a selection of MP3 players — including Winamp.

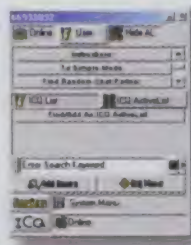
Products include: 4-MP3 2.4, Advanced MP3 Manager 1.0, BladeEnc 0.91, CDex 1.20, Dionysus' MP3 Encoder 5, MP3 Collector 1.01, MP3 Control 0.7.3, MP3 Filename Formatter 2.2, MP3



Manager 0.6.4.0, MP3Enc 3.1, MP3Engineer 3.0, Music Collector 2.3, MusicAmp MP3 Studio 1.0, myCaster 1.3, Napigator 1.04, Napster 2.0 Beta 5, Realizer 1.1, RightClick-MP3 1.65e, Sonique 1.30, Winamp 2.6.1

Instant messaging

Instant messaging is hot. It means you can conduct real time conversations over the Internet, find out when people are actually online and join in spontaneous chat communities.



To complement our review on page 89, APC has provided the full versions of some of the products featured in the review on this month's cover CD (disc 2). Details

on installing the products can be found on the CD.

Products include: AOL Instant Messenger (32-bit) 3.0.1464, Goovey 2.1 Beta, LanTalk 0.999, MSN Messenger Service 2.1.1047, Napster 2.0 Beta 5, PowWow (32-bit) 3.73, Rapman Instant Messenger 1.50, Yahoo Messenger 736

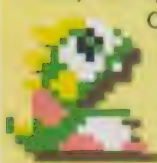
Retro CD

For our 20th anniversary issue, we've gone back through the archives and dusted off some old classics for your enjoyment.

For a start, CD 3 includes full versions of a number of classic games. Original and clone versions of Boulder Dash, Betrayal at Krondor and the Zork trilogy are just a few of the games you can revisit.

Products include: Abuse, Advanced Lawnmower Simulator, Anarchy, AT-SLOW 4, Betrayal at Krondor, Bombman, Boulder Dash, Chickie Egg, Commando Enhanced, Dink Smallwood 1.06, Giana Family, Giant Worlds Beta 0.82, Inner Worlds, Jetpack and Squarez Deluxe, JetSet Miner Willy, Jet-Set Willy, Jumping Jack, Lightcycles PC, Lords of Midnight 1.8, Manic Miner, Planet of Death, Pulsoid, Styx PC, The Ardennes

Offensive, The Whole New Ball Game, Thrust 0.89, Turbo Lode Beta 7, Uridium 98, Zork I, Zork II, Zork III and Zork: The Undiscovered Underground



Then there are the emulators we've talked about in our article on page 197. For legal reasons, we can't include all of the emulators discussed, but we have provided the best Amstrad, Amiga and Vectrex emulators on this month's CD.

Products include: CaPriCe32 1.1, DOS Vectrex Emulator 1.4, WinUAE 0.8.8 R8

Close the Window. Open the DOS

Forget the blue screen of death. Get into the black screen. We've hunted down some great programs for all you DOS diehards.

Products include: 4DOS, ABack 2.0, AntiViral Toolkit Pro for DOS 1.56, Boxer for DOS 7.5a, Compact Disc Master 3.5, DOS Box Shell Extension, DOS Navigator 1.51, DOSDuke for DOS 2.12, Dox for DOS, HJSplit for DOS, MasterBooter, Menulist 2.1, Mouskeys 3.05, PentaTextTools 1.5,

PKZIP for DOS 2.50, Prtscr 1.10, StupenDOS 5.0



Yeah baby!

Seven groooooovy desktop themes that will soon give you retro vision.

Products include: Austin Powers 3.0, Dr Evil 1.0, Fat Bastered 1.0, Abba 1.0, Disco 2.0, 1970s Rules! 1.2, Fab 50s 1.0, VW Bug, Lost in Space 1.0, Doctor Who Plus 2.1, Get Smart 1.0

Finally, for those of you who have been living with computers for far too long, we've scanned the entire first issue of APC and included it on the cover CD for your nostalgic pleasure. You can find it on disc 3, and view it easily using your Web browser.



Games

As always, our CDs contain the best new games demos available — to save you the hassle of downloading them. Read the reviews, then try the games yourself! On disc 1 you'll find demos of some of the games reviewed on page 193.

Products include: Rayman 2, Battlezone II, Killer Loop, Army Men: Toys in Space

Want more? As part of our birthday celebrations, we've decided to throw in a couple more games demos on disc 3. Enjoy them!

Products include: Army Men: Air Tactics, Invictus, Rollcage Stage II, Super 1 Karting, Superbike 2000



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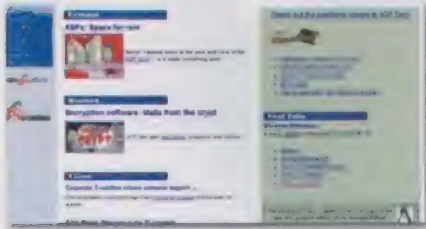
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Newswire

<http://newswire.com.au/>

APC's Newswire service offers the most comprehensive online technology news coverage in Australia. Newswire is the only 100% local IT news service, and is updated continuously throughout each business day.



Coming up next month

APC investigates patents and portals. How does the modern developer cope in the current IP climate, and how do the rulers of the Net direct you to the Web sites they want you to visit?

We seek out the fastest and lightest systems available, and review multiprocessor systems and ultraportable notebooks. The financial year is coming to a close, so it's time for APC's annual appraisal of accounting software, with a special focus on the GST.

We also review Web appliances and multimedia creation tools. All this, and a lot more in APC June, on sale May 17.

Conditions of entry

These conditions apply to all competitions in APC May, unless specific conditions are provided with the competition. Instructions on 'How to Enter' form part of the Conditions of Entry of all competitions in APC May. Entry is free and open to all residents of Australia other than employees of APC Publishing Pty Ltd (ACN 053 273 546), suppliers of competition prizes, their families and associated agencies. The contests close last mail May 16. Enter according to the instructions supplied with the individual competitions. The judges' decision is final and no correspondence will be entered into. No responsibility is accepted for late, lost or misdirected entries. All entries become the property of APC Publishing Pty Limited, the

promoter, 54 Park Street, Sydney, NSW 1028. The prizes are not transferable or redeemable for cash. Any change in the value of the prizes occurring between the publishing date and the date the prizes are claimed is not the responsibility of the promoter. Winners will be notified by security post and their names published in APC July.

Subscription promotion (page 144)

This offer is open to all residents of Australia who subscribe to Australian Personal Computer between 19/04/00 and 16/05/00. Your subscription and receipt of the Pocketbooks is subject to a valid signature against a valid credit card or, if payment is made by cheque, the cheque must be cleared for payment. Subscriptions are to be sent to Australian Personal Computer, Reply Paid 3357, Sydney, 2001; by phone 1800 252 515 (Freecall Mon to Fri 08:30 to 20:00

EST, Sat 08:00 to 18:00 EST) or online at apcmag.com/shop. Employees and their immediate families of the Promoter and its agencies associated with this promotion are ineligible to enter. Prizes cannot be transferred. Prize values mentioned are the recommended retail value as provided by the supplier and are correct at time of printing. The promoter shall not be liable for any loss or damage whatsoever (including but not limited to direct or consequential loss) or personal injury suffered or sustained by the prizes or in connection with any other prizes. They will take no responsibility for prizes damaged in transit. All entries become the property of the Promoter. All entries will be entered into a database and the Promoter may use the entrants' names and addresses for future promotional, marketing and publicity purposes unless otherwise stated.

More software on disc 1

NEW AND HOT
WINDOWS

Cross Trainer II 4.5.2, CyberClean 1.1, Fund Manager 4.6 (32-bit), HomeWatch 1.06c, Inoculate! Personal Edition 5.0.1, InstallXpert 2.0, MDaemon 3.0, MouseImp Pro 1.1.0.10, Net Buddy Pro 3.50, PictureViewer 1.5 P1.0.8, Poweroff 1.2, PowWow 4.0, RegMedic 2.4.04, Security Administrator 2.3, SimpleFind 1.1, SpotOn 1.0.159, WinTabs 1.4, XMLwriter 1.1, Zlurp 1.1.4

MAC

Alpha 7.3, DoltAllText 3.0.4, Epson Software Film Factory 1.0, Fallacy Tutorial (PowerPC) 1.0.2, File Buddy 5.3.4, FontTasteTaster 2.0, Melody Assistant 5.0, Mozilla (Mac) M14, MP3 Rage 1.8, NCSA Telnet 3.0a13, Norton AntiVirus Virus Definitions March 2000, Preference Packer 2.0, re:Sale 4.3, Smile 1.7, Sound Studio 1.1.5, Startup Doubler 2.5.3, UpdateAgent (PowerPC) 8.0, VSE Be Found 1.6

LINUX

aKtion 0.4.1, CodeCommander 0.3.21, ctheme 0.8.4, cURL 6.5, Disc-Cover 1.0.0,

gtkmail 0.9.1, id3tool 1.1e, Jungle Monkey 0.1.0, Knight Rider MP3 Player 0.5-2, Linux 2.3.99 (pre-release 1), MultiNet 2.2, pngcrush 1.3.6, Port Spy 2.1, Powertweak-Linux 0.1.10, REBOL/Core (Linux) 2.2, Remind 03.00.21, Setup 1.2, Spruce 0.5.18, The Webalizer 2.00-6, xxdiff 1.4

PALMPILOT

Beiks Tetris 1.0, NeoCal 1.01, Pocket Wine List, HackMaster 0.9, ICQ for the Palm Computing Platform

PSION

Asteroids 1.0, Contact Manager (MX), LittleSense 1.23, nFTP (Series 7/netBook) 1.20, Porfolio 5.10

WINDOWS CE,

FIS WinCE Suite 4.1, Handybook 2.0, JimmyARK 2.0, Pocket Organizer 1.0, Windows Media Player 1.0, XTNDConnect PC 4.1

WORKSHOP

Windows: DNTTools 2.0, eCleaner 2.01, miRC32 5.7 Relay 3.1, SurfSaver 2.0

Linux: Acrobat Reader, Linuxconf, Linzip, Licq, kruiser

Mac: Rainbow Painter 1.7, ShareDraw 2.0.2, Cameraid 1.1.3, iView Multimedia 3.7.2, Iconographer 1.1.1, Thumbnail Maker 1.1

OS/2: Blowfish for OS/2 1.62, Blow-Rapid Application Use 1.0 GA, MandelSteg 1.0, PGP Easy Rider 1.3.0, *Z*Crypt 0.3

Internet Toolkit

Adobe Acrobat Reader 4.0, Eudora Light 3.06, Free Agent 1.11, Go!Zilla 3.5, mIRC 5.6, RealPlayer G2, WinZip 7.0, WS_FTP LE 5.06

Browsers

Microsoft Internet Explorer (32-bit) 5.01, Netscape Communicator 4.7, Navigator 4.08

More software on disc 2

Linux games

Civilization: Call to Power, Quake III Arena, Unreal Tournament

Voice recognition

FreeSpeech Browser 1.0, IBM ViaVoice Pro Millennium Edition demonstration, Digalo TTS Engine 2000, ReadPlease 2000 1.0a, Willow TALK 2.5

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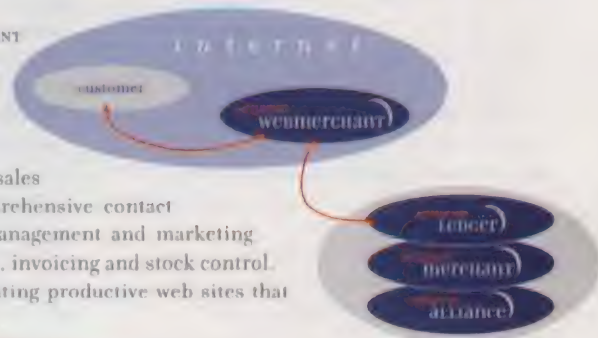


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EDITORIAL

Editor in Chief	Angus Kidman
(02) 9288 9172	akidman@acptech.net
Editor	Nathan Taylor
(02) 9288 9175	ntaylor@acptech.net
Senior Reviewer	Darren Ellis
(02) 9288 9115	dellis@acptech.net
Features Writer	Josh Mehlman
(02) 9288 9160	joshm@acptech.net
Journalist	Alex Kidman
(02) 9288 9116	alexx@acptech.net
Journalist	Andrew Colley
(02) 9288 9154	acolley@acptech.net
Journalist	Fiona Williams
(02) 9288 9121	fwilliams@acptech.net
Technical Assistant	Ryan Shaw
(02) 9288 9164	rshaw@acptech.net
Editorial Assistant	Laura Kane
(02) 9288 9123	lkane@acptech.net
Contributing Editors	Jeremy Torr,
	Stephen Withers

PRODUCTION

Chief Sub-Editor	Vanessa Richardson
(02) 9288 9126	vrichardson@acptech.net
Sub-Editor	Glenn Phillips
(02) 9288 9122	gphillips@acptech.net
Sub-Editor	Vanessa Fazzino
(02) 9288 9125	vfazzino@acptech.net
Creative Director	Michèle Heibel
(02) 9288 9136	mheibel@acptech.net
Artist	Craig Carroll
(02) 9288 9127	ccarroll@acptech.net

ACP TECH

Publishing Director	Glenn Rees
(02) 9288 9124	grees@acptech.net
Advertising Director	Mark Harrison
(02) 9288 9120	mharriso@acptech.net
New Media Manager	Chad Pearce
(02) 9288 9107	cpearce@acptech.net
Group Creative Director	Michèle Heibel
(02) 9288 9136	mheibel@acptech.net
Print Production Editor	Gail Lipscombe
(02) 9288 9176	glipscombe@acptech.net
Electronic Production Editor	Andrew Broadhead
(02) 9288 9109	andrewb@acptech.net
New Projects Manager	Helen Duncan
(02) 9288 9105	hduncan@acptech.net
Consulting Publisher	Jeremy White
CEO	John Alexander
Group Publisher	Jill Baker
New Media Manager, ACP	Matt Bateman
(02) 9288 8311	mbateman@acptech.net

NEWSWIRE

Editor	Roulla Yiacoymi
(02) 9288 9104	ry@acptech.net
Journalist	William Maher
(02) 9288 9161	wmaher@acptech.net
Journalist	Cosima Marriner
(02) 9288 9163	cmarriner@acptech.net
Journalist	Simon Vandore
(02) 9288 9130	svandore@acptech.net

ELECTRONIC PRODUCTION

Notes/Web Developer	Dan Lowden
(02) 9288 9199	dlowden@acptech.net
CD/Web Assistant	Suzanne Quill
(02) 9288 9110	squill@acptech.net
CD/Web Assistant	Jonathan Kinred
(02) 9288 9199	jkinred@acptech.net
CD/Web Assistant	Nola Camden
(02) 9288 9110	ncamden@acptech.net
CD/Web Assistant	Lachlan Grant
(02) 9288 9137	lgrant@acptech.net
CD Assistant	David Slatter
(02) 9288 9199	dslatter@acptech.net

POCKETBOOKS

Editor	Ashton Mills
(02) 9288 9188	amills@acptech.net
Deputy Editor	Lindsay Hayman
(02) 9288 9132	lhayman@acptech.net
Artist	Niki Creed
(02) 9288 9123	ncreed@acptech.net

ADVERTISING

National Advertising Mgr	Mark Harrison
(02) 9288 9120	mharriso@acptech.net
Senior Account Manager	Sumit Roy
(02) 9288 9143	sroy@acptech.net
Senior Account Manager	Alison Watson
(02) 9288 9149	awatson@acptech.net
Account Manager	Justin Cain
(02) 9288 9157	jcain@acptech.net
Sales Qld	Noel Fitzpatrick
(07) 3000 8500	
Sales SA	Chris Arnoul
(08) 8361 9999	
Sales WA	Diane Slade
(08) 9481 4127	
Marketplace/Account Manager	Nicholas Riviere
(02) 9282 8905	nriviere@acptech.net
Advertising Production	Peter Slingo
(02) 9282 8626	

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CONTACTING APC

For general queries and comments, email is APC's preferred means of communication:

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Reader inquiries/back issues

Contact Laura Kane

Phone (02) 9288 9123

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Contact Heather Milley

Phone (02) 9438 1300

Sydney office PO Box 4088,
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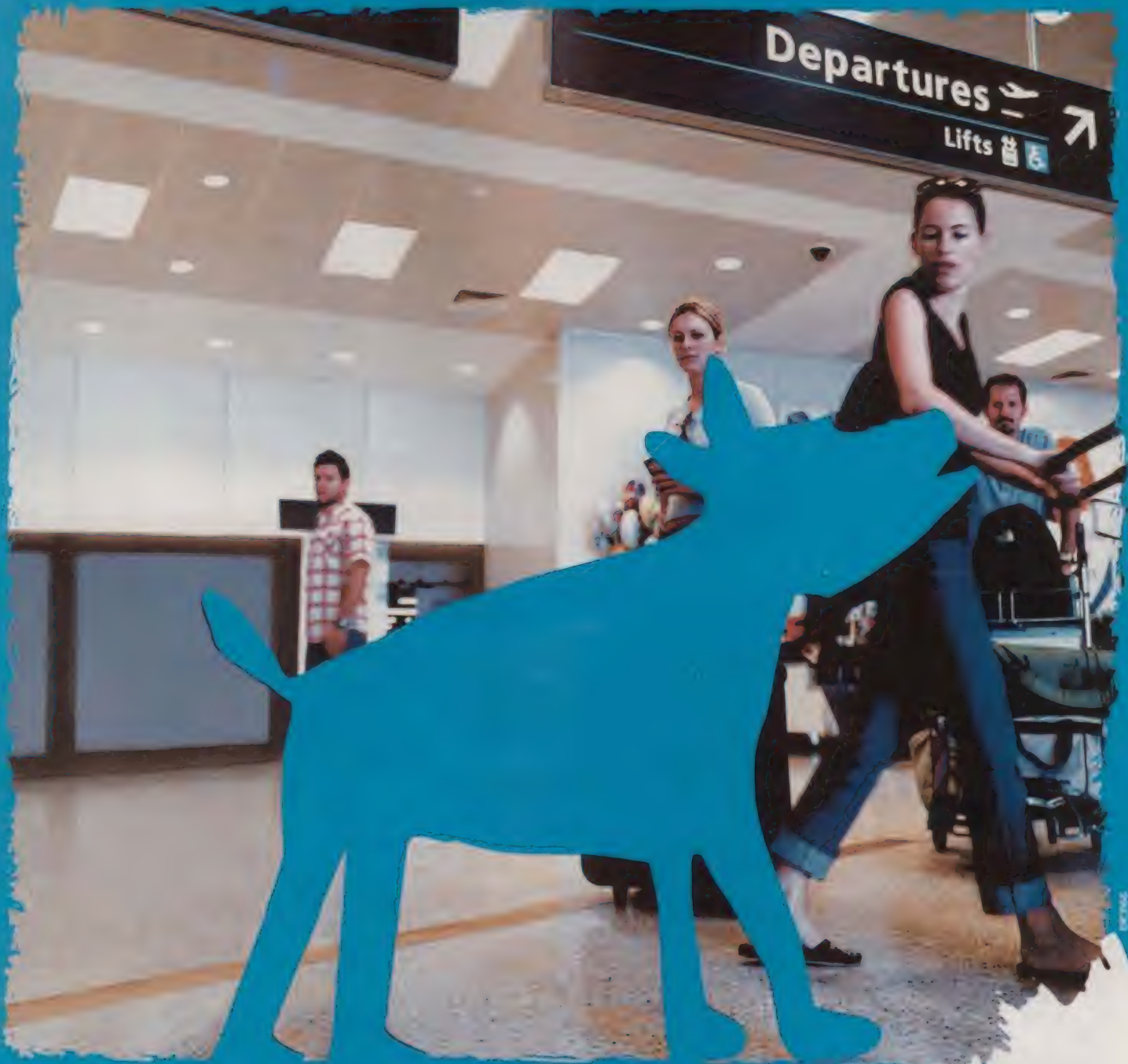
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CONSOLE WARS

X-Box detailed amid confusion

Microsoft has finally released technical specifications for its much-rumoured X-Box game console, but with a release date of late 2001 and last-minute changes to the specification, it's unclear how much of an impact it will have in the competitive console market.



The X-Box specification, which aims to use PC technology as the basis for a games console (see 'Game on', APC April, page 69), was officially launched at the Game Developers Conference in San Jose in mid-March.

As expected, the X-Box will be promoted as a competitor to

Continued on page 18

SAUSAGE DISSOLVED IN SOLUTION 6

Telstra's \$5 billion software mix

Telstra has placed all of its software development eggs in one basket, pushing through a merger between local accounting software and ASP company Solution 6 and Web development company Sausage Software.

The merger has created a new software behemoth valued at \$5 billion and effectively controlled by the telco.

In late March, Solution 6 announced a merger with Sausage Software and a buy-out of some of Telstra's e-commerce assets. Solution 6 plans to join with Sausage to form a single software company under the name Solution 6. The deal will take place via a six-for-10 share swap, with Sausage keeping control of 47% of the new company.

Solution 6 will remain a separate company, but Telstra's hand was evident in the deal — no surprise, given its ownership levels in both companies and the appointment of former Telstra executive Lindsay Yelland as Solution 6's COO just a week before the merger.

The deal was valued at \$3.5 billion at the time of the



announcement; massive gains in the share prices for both Sausage and Solution 6 on the day pushed the total value closer to \$5 billion.

The merger will allow Solution 6 to expand its reach beyond its 100,000 accounting business customers and into the small to medium business market. Sausage has over 800 small business customers

around the world using its ERP software and also sells one-stop e-commerce packages such as Business in a Box. Solution 6 will also use the opportunity to rent Sausage software over the Internet. CEO Chris Tyler said that Sausage products will be added to the Centrum service,

Continued on page 18

X-Box announced amid confusion

Continued from page 17

Sony's new PlayStation2, Sega's recently released Dreamcast console, and Nintendo's forthcoming Dolphin. Like the PlayStation2, the X-Box will feature a DVD drive and will be able to connect to the Net for online gaming. Although the X-Box won't initially be capable of Web surfing, this will become possible with software upgrades. Officials claim that upgrades will allow the X-Box to connect to broadband or cable networks.

Microsoft has chosen a nVidia chip for 3D graphics and will include 64M of RAM and an 8G hard drive. The X-Box won't use Windows CE as its operating system, but a

developed chip hasn't yet been announced.

The official list of specifications sent to the media did not specify the brand of processor, stating only that the X-Box would feature a "600MHz x86-compatible CPU".

How the deal got snagged at the last minute is not known, but trade papers speculated that Intel had undercut AMD. "We were not prepared to get into a sort of scorched earth price war with Intel to get [Microsoft's] business," an AMD spokesperson told *US PC Week*. Intel could use a boost in its battle with AMD, which has threatened to outstrip Intel's longstanding dominance of the



custom piece of software based on the Windows NT kernel. Using the DirectX graphics engine, the system will produce over 300 million polygons a second, more than three times as many as the PlayStation2, officials claim.

The subject of greatest contention has been the chosen processor. When Microsoft announced details of the X-Box to Australian media, a day ahead of the official US launch, the specifications included a 600MHz processor which would be supplied by AMD.

Later that day, when CEO Bill Gates officially launched the X-Box at the Game Developers Conference, Intel had jumped back into pole position as the preferred processor supplier. The basic specification (600MHz) remains the same; whether this will be a product from Intel's existing Pentium III line or a newly

PC processor market (see special report, page 30).

Whatever processor it chooses, Microsoft knows it will have to play catch-up to compete with console giants Sony, Sega and Nintendo. Money, it seems, is no object—officials plan to spend more money launching X-Box than they did with Windows 95.

Timing will be critical. The X-Box will hit the market at about the same time as Nintendo's Dolphin, which will be released in the US and Europe in the first half of 2001. No local release dates are available yet.

When the machines are finally released, they will compete with Sony's new PlayStation2 (which has shipped in Japan, but has memory card problems) and Sega's Dreamcast, which is now available in most major world markets.

Angus Kidman and William Maher

Telstra's \$5 billion software mix

Continued from page 17

which charges customers a monthly rental fee to use software over the Web.

ASP remains a top priority for Telstra and its new entity (see page 26). Telstra officials have moved to dampen speculation that it will be spinning off other Internet arms, including its recently announced application-rental projects.

Telstra convergent business director Ted Pretty said the ASP business will stay within Telstra, although there are potential projects in the health, education, manufacturing and retail markets. "It's quite likely you'll see us partnering aggressively in other vertical markets," he said.

Telstra will own a 40% stake in the combined Solution 6 and Sausage entity. The carrier already owns 10% of Sausage and has struck a \$50 million deal to increase its stake in Solution 6 to 40%.

Solution 6 also increases its Telstra ties through a \$237 million asset deal. Telstra will sell Solution 6 its business-to-business Internet service eConnect, its banking transaction facility Telstra Financial Management Service and its 30% stake in PlesTel, a telephone and data service for small businesses.

For Telstra, the merger deal has eliminated the need for it to set up a separate holding company for its Internet-related operations. The telco had been widely reported as contemplating a plan to float an investment company, CB Holdings, which would manage Telstra's shares in Solution 6, Sausage and other companies such as Computershare.

William Maher and Angus Kidman

Page 26: We wanna be your ASP

\$100 MILLION FROM AAPT

AOL makes the switch

Telstra isn't the only company that is radically refitting its online presence. After European media giant Bertelsmann pulled out of its joint venture with AOL to operate the AOL Australia service, AOL opted for a new \$100 million partnership with AAPT.

In mid-March, AOL bought out Bertelsmann's 50% stake in the local operation for an undisclosed sum. A restructuring of AOL's deal with Bertelsmann has been expected ever since AOL announced its merger plans with the Time Warner empire earlier this year.

Two weeks later, AOL unveiled its new joint venture

with AAPT. The company is planning extensive cross-marketing activities and a new push into the wireless market. However, AOL managing director Carol Veriga won't be making the switch; she resigned on the same day the deal was announced.

Since its heavily hyped launch in 1998, AOL Australia has persistently been dogged by rumours of low subscriber numbers; some analysts have placed the figure as low as 15,000, a mere drop in the ocean compared to those of market leaders OzEmail and Telstra. AAPT has 600,000 customers across all operations.

Angus Kidman



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GST CRACKDOWN

ACCC warns on PC upgrades

Australian businesses have been warned against using the GST as an excuse to upgrade PCs and computer equipment.

According to Australian Competition and Consumer Commission (ACCC) chairperson Allan Fels (pictured), many businesses are adding new PCs to the compliance cost of the goods and services tax, which takes effect from July. He warned that "a large part" of that cost is not attributable to the GST. "Many businesses are claiming compliance costs when all they are really doing is just upgrading their computers," he said. Accounting software firms have predicted a boom in PC sales as businesses choose to use computers to comply with the new tax.

Under the GST, businesses can adjust their prices depending on whether the GST increases or decreases their costs. If the new system causes costs or taxes to rise by \$1, then prices may also rise by \$1. Fels warned that the cost of new PCs should be spread over several years. If a PC is used for three years, then the cost should be accounted for over that period.

The ACCC has also released GST pricing guidelines, including a rule that no prices can rise more than 10% because of the GST. The rules also explicitly prevent busi-



nesses raising prices before the GST actually comes into effect.

For the IT sector, the GST should mean a fall in prices for PCs and other hardware, which will no longer be affected by current sales taxes. Currently, software is not taxed and is expected to rise in price after July 1.

Fels downplayed concerns that many businesses would try to illegally raise prices once the GST is in place. He claims low inflation, competition and consumer concerns will encourage businesses to comply.

The ACCC has also set strong penalties for breaching GST guidelines — up to \$10 million for businesses and \$500,000 for individuals. "The agency [ACCC] is prepared to go to court," he said.

TELSTRA AND CHELLO EXPAND REACH

And broadband for all?

Telstra has announced plans to deliver broadband services to 90% of the Australian population within two years. In addition to its cable and satellite services, Telstra said it intends to deploy ADSL (asymmetric digital subscriber line) technology, transforming copper phone lines into high-speed digital lines.

Telstra has been conducting trials for some time, but until now has been reluctant to provide a specific time frame.

It has a long road ahead if it is to achieve this goal. Industry sources say the telco has only 100 operational ADSL lines at present. That figure is expected to increase to 1,000 by August. Telstra blamed the ADSL rollout and the work on its customer access network for the 22% increase in its capital expenditure to \$2.2 billion.

Telstra is keen to build up its data revenue, but the broadband market is not Telstra's alone. Primus has already launched its own commercial ADSL service, and Request DSL recently outlined details of its service in partnership with Cisco. Telstra and Optus are also going head-to-head in the cable Net market (see APC April, page 30).

The regional broadband market has also flourished. European high-speed Internet company chello has made its

first foray into the Australian market, partnering with pay TV provider Austar to deliver broadband access to rural and regional areas.

Already passing 75,000 homes, Austar will now roll the chello broadband service out to 60 points of presence around the country. By the fourth quarter of this year, the chello service will be available to 2.1 million homes. Officials told APC the service will also be available in capital cities within 18 months.

chello costs \$65 a month for unlimited broadband Internet access with no download limits. It costs \$95 for Austar's 380,000 pay TV customers to have the service installed and \$199 for the general population.

The chello broadband service is delivered by MMDS (multichannel multipoint distribution system) wireless technology with a telephone line return path. chello intends to move to two-way MMDS by the end of the year. "MMDS happens to be the most effective and robust way to deploy broadband access across these types of teledensities," Austar United Broadband managing director Dana Strong said. Those homes outside the 50km reach of the MMDS base stations will receive the service via direct-to-home satellite.

Cosima Marriner

News Roundup

• Australian ISP eisa has reported a loss of \$13.8 million, almost three times the amount forecast in its prospectus last July. In its preliminary report for the year ending December 31, 1999, eisa recorded \$14.029 million in revenue and a net loss of \$13.795 million. Prior to listing on the Australian Stock Exchange last August, eisa forecast a loss of just \$5.428 million. The

loss casts doubts on the company's net income forecast of \$3.8 million for this year. eisa has been busy shopping around for investors to back its buyout of OzEmail's consumer business.

• Following in Telstra's footsteps, Cable & Wireless Optus has announced price cuts for both its dialup and broadband Net access systems. Dialup fees have been cut by up to 13%, but the main price reductions are in its high-volume access plans. For its Optus

@Home broadband service, Optus has dropped its installation fee by \$100 for customers who already have an Optus local call or pay TV system installed. For customers who sign up for 12 months, that means an installation fee of \$99. The offer is valid until the end of May. Telstra — Optus' main rival in the broadband arena — is charging \$99 for all cable installations until the end of June, although it requires users to sign up for 18 months.

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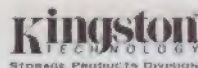
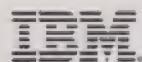
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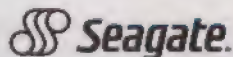
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ANTITRUST RULING

Microsoft: Guilty but unrepentant

Microsoft violated antitrust law by using its dominance of the operating system market to stop other competitors from entering the browser market, Judge Thomas Jackson has ruled, paving the way for stringent new operating regulations or possibly even an enforced break-up for the software giant.

While the decision in the long-running case represents a major blow for Microsoft, it can draw some small comfort from the fact that Jackson did not find the company guilty of illegal contracts with OEMs.

"The facts found do not support the conclusion that the effect of Microsoft's marketing arrangements with other companies constituted unlawful exclusive dealing," the conclusions of law note. However, Jackson decided that the company tying together Windows and Internet Explorer had effectively blocked competition in the browser market.

A decision against Microsoft was expected following the collapse of last-minute settlement negotiations. Jackson ruled last November that Microsoft was a monopoly, making a negative decision likely.

The next stage in the case is to identify legal remedies.



Suggested remedies have ranged from opening up the source code for Windows to forcing Microsoft to break into several companies.

During a press conference to respond to the finding, CEO Steve Ballmer and chairperson Bill Gates both reiterated Microsoft's line that its actions were only designed to benefit consumers. "This ruling turns on its head the reality that consumers know," Gates said.

"When you look at the incredible pace of technological change, it's clear that Microsoft and every one of our competitors must compete and innovate."

Microsoft is pinning its hopes on an appeal following the announcement of remedies in the case, which isn't expected until mid-year. "We believe we have a very strong case on appeal," Gates said. Meanwhile, DOJ officials welcomed the ruling.

Angus Kidman

Cashbook: Floating not sinking

For evidence that the love affair between the Australian Stock Exchange and technology companies is still mostly aflame, you don't need to look any further than the performance of Solution 6 and Sausage on the day of their merger (see page 17). Solution 6 climbed a whopping 35% in a single day, and Sausage wasn't far behind, gaining 27%. Not bad for a stock that was trading in single-digit figures just two or so years ago.

That general enthusiasm is reflected in some of the more recent tech floats. Success on a largely unprecedented scale was the welcome fate of IT outsourcing outfit KAZ Computer Services, which has stolen the crown from Melbourne IT as Australia's most successful technology float. KAZ sold 22 million existing and 10 million new shares at \$1 each to raise \$32 million. The offer capitalised KAZ at \$80 million when it floated. By the close of trade, it was worth four times that amount. Just a week later, KAZ announced plans for a six-for-one stock split.

Technology company Beyond Online also did nicely, almost tripling in value on its third day. Its shares were issued at 40 cents and opened

at \$1.10, an increase of 175%. Shares hit a high of \$1.50 before closing at \$1.09.

Surprisingly, continued hype for wireless technology didn't create a massive buzz for wireless communications company Wavenet. It splashed onto the ASX with a respectable but not stunning 60% increase on its issue price. Wavenet shares, which were issued at \$1, debuted at \$1.60 and hit a high of \$1.65.

Perhaps enthusiasm will eventually be muted by the apparently desperate antics of some resources companies. Faced with shareholder pressure to find new investments, some have chosen

companies of often questionable quality. Would you really want shares in a company that's aiming to "replace the World Wide Web", or one that has cash stashed in a business known as laugh.com? They're out there, but you may want to keep looking.

For up-to-the-minute financial news from the IT sector, check out Newswire's continuously updated Cashbook service at <http://newswire.com.au/cashbook/>.



News Roundup

● Kidz.net is developing a Muslim version of its restricted child-safe Internet product with communications company e-Phone. The specialised service, which provides secure access to over 100,000 Internet sites via a special CD and browser, will be up and running by June. e-Phone CEO Bob Barraket said the company is in discussions with representatives in Pakistan,

Bangladesh, Indonesia and the Middle East to make the service available in their countries. Barraket said although the service targets a specific group, the market is potentially enormous. "It's a significant ethnic group," he said. "It's one-third of the world's population."

● Forget porn, we're sick of those ads. A study of 566 people by Project Media has identified advertising as the most "bothersome" email among managers and

employees. The report found over 35% of respondents did not like email advertisements, and the next least popular emails were mailing lists and sexual pictures. The research was commissioned by Content Technologies, which said companies face the risk of lawsuits from email abuse.

For complete versions of these and many other stories, be sure to check into <http://newswire.com.au>.

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Mojo TMM0558/A/2

Telstra is forging alliances left, right and centre in an attempt to dominate the application rental market.

Telstra: We wanna be your ASP

Telstra may have been criticised in recent months for its planned massive staff cuts and lack of rural service options, but that doesn't appear to be its main concern anymore. The telco is quietly building a network of partnerships that could see it dominate the unglamorous but highly lucrative market for application rental.

Telstra has outlined a series of alliances with major software providers and other interested parties that could see it become the dominant force in application service provision (ASP). In March alone, it signed deals with Microsoft, Lotus and PricewaterhouseCoopers (PWC) — even before its massive deal to combine Solution 6 and Sausage Software became public (see 'Telstra's \$5 billion software mix', page 17).

Under the Microsoft deal, Telstra will become the network provider for a pilot



financial reason to be nervous about new pricing models; Office is its single largest revenue earner.

Initially, the market for ASP is expected to be slightly larger enterprises that want to take advantage of technologies for customer relationship management and active inventory management but can't afford the required hardware and technical support. "One of the barriers to traditional ERP implementations to medium-sized enterprises has been the initial entry cost including hardware, software and implementation," said Ted Pretty, managing director of Telstra's convergent business unit, and the driving force behind the company's current ASP push.

Needless to say, Telstra has made several plays in the emerging enterprise resource planning (ERP) market. It has announced a strategic alliance with PWC to roll out ERP solutions in Australia and throughout the Asia-Pacific region. Under the PWC deal, Telstra will provide hosting and ISP services, while PWC will provide integration expertise. It has also done a deal with SAP to host its mysap.com service in this region.

Telstra has also made a licensing deal with Lotus to trial the supply of its QuickPlace, SameTime and SmartSuite applications via an ASP model. The arrangement follows on from an existing partnership between the two companies under which Telstra hosts Domino servers under the Notes Public Network program, and the presence of SmartSuite shows that Telstra doesn't want to depend solely on Microsoft. The initial trial, which runs from April to June, will be open to customers of Telstra's Big Pond Business ISP, and will use a standard Web browser for software access.

Maximising returns

For Telstra, the move into the ASP space is logical. As data becomes the dominant form of traffic on its existing networks, it wants to maximise the fees it can charge for those services. Current government legislation caps the rates which Telstra can charge for raw data to consumers, but businesses are willing to pay hefty premiums for ASP services if their overall cost of ownership is reduced. Since most current ASP plans involve a fixed monthly price, it can also make business IT costs more predictable.

Although the new deals expand its range and confirm its unwillingness to be tied down to a single partnership, Telstra's most visible play in the ASP market remains its ongoing involvement in Solution 6. Telstra first invested in the accounting software provider last year, upping its stake to about 25% and providing the main network services for Solution 6's Centrum service. The relationship between the two companies intensified in March when former Telstra executive Lindsay Yelland joined Solution 6 as its chief operating officer, a move that was followed by the Sausage deal.

Many of Telstra's new ASP deals stem from the Centrum base. The initial round of software offerings via Centrum included SAP and Notes, and discussions have been held between Solution 6 and Microsoft over hosting for Office.

Despite the rush to ASP, not all observers are convinced it will be a major force in software. Late last year, research company Meta Group warned that ASP would fail in many enterprises, and predicted that pricing would fluctuate throughout the next two years.

Angus Kidman



newly minted ASP guru Ted Pretty

scheme to rent Microsoft's Office suite to small and medium businesses. Outsourcing business Tequinox is also partnering with Microsoft for the rollout, which will allow selected customers to run Office from remote servers. (When the global Office Online program was originally launched last November, Microsoft refused to divulge its local partners.) It predicts the service will be active by June.

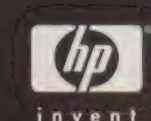
With an estimated 80% of the office suite market, Office could easily dominate the rental market, but Microsoft has consistently emphasised that it doesn't believe that ASP will suit all customers. It has good



Does your PC need a faster processor?



If the icons pictured above are all too familiar, then the answer is yes. The AMD Athlon processor is the fastest x86 performing processor in the world today. And as part of the new HP Pavilion PC range it means you'll have quicker access to the internet, digital imaging, graphics and of course, games. There are two models to choose from (the Pavilion 8610 with 600mhz RRP \$2999 and the Pavilion 8615 with 700mhz RRP \$3999) and both come with a CD-writer and 56K modem.



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Problem gamblers could be forced to use smartcards to access online casinos under a Senate committee proposal. But will such controls take off?

Gambling regulators look to smartcards

Online gamblers could be forced to use smartcards that restrict the amount of money they can bet and the frequency with which they visit sites, if a Senate proposal for regulating the Net gaming industry is adopted.

The Senate Select Committee on Information Technologies has released its report on cybergambling, *Netbets: A review of online gambling in Australia*. The Senate began its investigations in June last year, but the topic became a political hot potato last December, when Prime Minister John Howard foreshadowed a possible ban on online gambling.

Specific recommendations by the committee include a ban on the use of credit cards to pay for bets or receive winnings, fixed betting amounts, secure passwords and strict privacy arrangements. Onscreen displays should include a permanent display of wins and losses and should not indicate 'near misses' in a bid to induce continued gaming, the committee recommended.

The report argues that casinos should also provide chat rooms where staff can provide details on gaming odds, and include links to resources for problem gamblers. The report also calls for states and territories to contribute a percentage of gambling revenue to a national education campaign, and the establishment of an advertising code of conduct.

Until those policies are implemented, the committee has argued that no further gaming licences should be issued. Fourteen licences for online gaming have been issued to date.

The smartcard option

The committee's proposed regulatory scheme largely walks a middle line between an outright ban on gambling — a notion supported by conservative senators Brian Harradine and John Tierney — and a non-interventionist approach. Buried within the 253-page report, however, is a more controversial proposal: the use of smartcard technology to control the way gamblers access sites.

"Technology currently exists that would assist with the implementation of some of the harm minimisation policies,"

the report notes. "Smartcards could be used to access all online gambling services and could limit the amount and duration of the gambling. Further, information stored in the cards could be used to identify problem gamblers."

It is not specified how such a move could be undertaken while maintaining protection of gamblers' privacy. The report notes that it is essential to have "strict privacy arrangements to protect consumers' financial details including gambling accounts, credit card identification and exclusion arrangements". The Democrats have already expressed concern over protecting the rights of individuals when regulating gambling.

The idea of using smartcards was presented to the committee by the Twenty-Two Consortium, which has patented a design for a gambling smartcard. The patent applies to any computer-networked smartcard used in gambling, and could be applied to poker machines in clubs (which are linked via internal networks) as well as Net gambling sites. The report notes that the universal adoption of such smartcards — a proposal that would meet fierce resistance from the club community — would make implementing exclusions for problem gamblers easier.

The committee also appears to believe that using a smartcard-centred approach would result in increased business for Australian online casinos. "Harm minimisation policies and the convenience of smartcard technology would steer gamblers away from overseas-based gambling sites and their associated risks, and towards Australian sites," the report states. However, it also recognises that there are no effective methods of barring excluded gamblers from overseas sites.

The report highlights the increasingly interventionist role that the government is taking with online gambling, in an apparent bid to gain control over the area before it creates social problems on the same scale as poker machines and



other offline forms of gambling. However, this approach doesn't appear to be dissuading existing businesses from pursuing the online gambling market. For instance, casino operator Lasseters has outlined plans for a \$40 million public float.

Lasseters demonstrates the potential market for online gambling. The online operation is already growing more rapidly than Lasseters' physical casino in the Northern Territory. Revenue is growing month by month by 41%, and is expected to account for 22% of an anticipated annual revenue of \$29.4 million. However, Lasseters has decided to largely avoid the US market — where legislation effectively bars online gaming sites — and instead concentrate on developing its business in Europe and Asia.

Despite such growth opportunities, gambling sites aren't yet a licence to print money. Listed online gambling business eBet has experienced a dramatic increase in subscriber numbers, but it is yet to turn a profit. For the half-year ending in December, eBet reported revenue of \$614,000 and an operating loss of \$1.9 million.

Angus Kidman

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SPECIAL REPORT

1GHz: Milestone or

In the race between Intel and AMD to 1GHz, far too much emphasis has been placed on the milestone, when the race is where the real interest is.

One gigahertz. One billion clock cycles a second. So what? There is no question that 1GHz is significant, but rather than representing a particular performance or design challenge, it's a psychological or marketing milestone. Neither the 1GHz Pentium III nor the 1GHz Athlon are new processor designs; they are just 25% faster than their 800MHz predecessors.

Clock speed is a rather arbitrary measure of processor performance. An AMD Athlon and an Intel Pentium III running at the same clock speed will perform differently under different circumstances. Clock speed can only be used to compare the performance of a processor against another processor of exactly the same type.

And 1GHz does not mean a billion calculations a second, or 1Gflop, a milestone which was passed by supercomputers many years ago and by single processors over a year ago. With pipelining, multiple execution units and SIMD extensions, today's processors can churn through quite a large number of calculations per clock cycle. Finally, these 1GHz processors are by no means the fastest on the planet. Compaq's Alpha processor outperforms the 1GHz Athlon and Pentium III — at least in floating point calculations — at a leisurely 700MHz.

Intel co-founder Gordon Moore formulated Moore's Law in reference to the density of transistors on a microchip, which he said would double every 18 months. This roughly translates to the power of a processor doubling every 18 months. Since Moore formulated the law in 1965, processor power has doubled approximately every 18 months — until this year.

In the April 1999 issue of *APC*, we had our first look at Intel's Pentium III processor, running at a groundbreaking 500MHz. Just over a year later, we're looking at the first 1GHz processors. However, this only takes into account the clock speed. Intel's first Pentium III was built under a 0.25-micron process and had a 512K level 2 cache running at half the clock speed. The

1GHz 'Coppermine' Pentium III is built under a 0.18-micron process, and has a 256K level 2 cache built into the processor chip. These two changes in the processor's manufacture also improve its performance, so that a 1GHz Coppermine Pentium III more than doubles the processing ability of the 500MHz Pentium III.

It is significant that AMD released a 1GHz chip two days before Intel; nine months ago, no-one would have believed AMD would beat Intel to anything. Without serious competition at the high end of the market, Intel would have kept releasing processors at a leisurely rate, maximising its profit margins along the way. Before

performance and clock speed supremacy. AMD got in some good punches with its early Athlon releases, but Intel won some of the later rounds after switching to the Coppermine design. In retaliation, AMD brought forward its 0.18-micron production schedule in order to beat Intel to the 1GHz mark.

The new batch of Athlon processors still use a 512K off-chip cache at one-third of the clock speed. AMD will be able to take advantage of the 0.18-micron process to modify the design of the Athlon to include the cache in the processor chip, which will give Athlon an additional performance boost. AMD has not indicated when it's likely to make this change.

Further into the future, Intel will release a new processor codenamed 'Willamette', which will feature a redesigned pipeline, run on a 400MHz system bus and incorporate an additional range of SIMD extensions for multimedia processing. Albert Yu, the general manager of Intel's microprocessor products group, said that Intel expects to be shipping Willamette processors by the end of this year.

Before Athlon was released, pundits were predicting AMD would have trouble producing it in sufficient quantities (see *APC* August 1999, page 85); AMD had previously encountered manufacturing problems with its K6-2 and K6-III. As it turned out, Intel had production difficulties with its 0.18-micron production process, and major manufacturers such as Gateway turned to Athlon because Intel couldn't deliver enough Pentium IIIs.

AMD and Intel are also battling it out for the lower end of the market. Intel's announcement of a new version of the Celeron processor — featuring the same processor core as the Coppermine Pentium III — was quickly followed by AMD's announcement of the Spitfire processor, a similarly cut-down version of the Athlon.

Another effect of the AMD-Intel performance war has been the speed with which new processors are incorporated into systems. It's now a matter of weeks rather than



Athlon, Intel planned to release an 800MHz processor by the middle of this year and a 1GHz processor by the end of the year.

When AMD released the Athlon processor in August last year, everything changed. Previously, Intel had the top end of the x86 processor space all to itself, leaving its competitors to battle it out at the lower end. After Intel released the Celeron processor, the low end became so unprofitable that almost all the competitors dropped out. However, AMD had a long-term plan to kick Intel right where it hurt most — in the profitable high-end market — with a completely redesigned top-performance processor.

Since the Athlon's release, AMD and Intel have been locked in a battle for

meaningless?

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Hard disk file system	FAT32
Graphics card	nVidia GeForce 256
Video bus type	AGP
Video RAM	32M
Video controller chip	nVidia GeForce 256
Graphics driver name and version	NVDISP.DRV 4.12.01.3069
Monitor	21in Gateway
Tested resolution/colour depth/refresh rate	1,024 by 768/16 bit
CD/DVD-ROM drive	12x DVD and CD-R
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Modem	56K internal
OS available	Windows 98/2000
Warranty	3 years RTB parts and labour
Bundled software and accessories	Microsoft Works Suite 2000, DVD Adventure Suite, Norton AntiVirus

Product	Gateway Select 1000	Pioneer 2000 Power System 800MHz (for comparison)
Business Graphics WinMark	407	339
High-End Graphics WinMark 99	1,260	1,033
Business Disk WinMark	5,103	4,913
High-End Disk WinMark	17,000	16,800
CPUMark 99	78	68
FPU WinMark 99	5,427	4,350
Business Winstone 99	32	30
3DMark99 Max	6,935	6,651
3DMark2000	3,845	4,536
Viewperf AWADVS	67.06	79.13
Viewperf DRV	25.32	27.72
Viewperf DX	38.17	37.93
Viewperf Light	3.58	4.048
Viewperf ProCDRS	10.31	13.4
Quake III: Arena 640 by 480 at 16 bit	109.9	95.1
Quake III: Arena 1,024 by 768 at 16 bit	66.2	62.2
Quake III: Arena 1,600 by 1,200 at 32 bit	Unable to run	21.5
SYSMark2000	169	133

months from the time an announcement is made that a processor is shipping, to the time the product becomes available to Australian consumers.

Gateway Select 1000

The day after APC sent the April issue to the printers with the roundup of the fastest PCs available, and following speculation about 1GHz processor release dates, AMD announced the immediate release of the 1GHz Athlon. C'est la vie. As mentioned previously, the fact that the 1GHz mark has been reached is not the surprising or important point — it's the fact that processors have suddenly jumped from 800MHz to 1GHz without the intervening processor increments of 66MHz.

For the purpose of this review, APC was hoping to compare the Gateway Select 1000 to the Dell 1GHz Pentium III machine. However, Dell was unable to supply us with a machine in time. The best comparison we could make was between the Select 1000 and the Pioneer 2000 Power System (an 800MHz Athlon), reviewed in APC April, page 94. The two systems have similar specifications: 34 and 20G IBM hard drives respectively, and both have 128M of SDRAM, 32M nVidia GeForce video cards, and Sound Blaster Live soundcards.

Looking at the results, one thing is apparent: the Ziff-Davis Business Winstone score is not nearly as high as you would expect. Currently, the secondary cache on the AMD Athlon runs at one-third of the processor clock speed for the 1GHz — a leisurely 333MHz. Intel's Pentium III cache runs at the same clock speed as the

processor. If AMD doesn't fix this problem by placing a full-speed cache on the processor chip, it could run into problems. Its score of 32 is the same as many of the 800MHz Pentium III machines from last month's roundup (see APC April, page 88).

The 1GHz system scored 15% higher than the 800MHz Pioneer in the CPUMark 99, and its FPU WinMark 99 score exactly reflected the increase in clock speed, with a 20% higher score. This FPU WinMark 99 score eclipsed every other machine APC has ever tested — by a huge margin.

This is all well and good, but if you're looking to blow your money on the latest and greatest system for home use, then the performance gains with the 1GHz chip show up in that arena too. The graphics scores alone were far higher than any other system APC has tested, including the Dell Dimension 800B (see APC April, page 90), which had the same video card but twice the DDR RAM.

The frame rates in the Quake III: Arena timedemo tests were exceptionally high: 66.2fps at 1,024 by 768 at 16-bit colours. We were unable to run Quake III: Arena at 1,600 by 1,200 at 32 bit, and the 3DMark2000 score was lower than expected. However, the High-End Graphics WinMark 99 and Business Graphics WinMark scores were the highest ever seen in APC Labs. The 21in monitor complements this system nicely.

With these graphics, the DVD-ROM drive, Sound Blaster Live video card and the bundled Boston Accoustics 7500 subwoofer and speaker set, home theatre, sound and cinema will be a dream. If you're planning to use this at work, it may be overkill — except, of course, for graphic design or CAD operations. The Select 1000 is pricey at the moment, but this is to be expected with such a cutting-edge machine.

Josh Mehlman and Darren Ellis

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InDesign 1.5

InDesign is a professional desktop publishing package which is fully integrated with Adobe Photoshop and Illustrator. It's arrival last year was accompanied by plenty of excitement and decent sales, but the design community has yet to desert QuarkXPress.

Version 1.5 provides a number of new features, but some users are annoyed that fixes for bugs in 1.0 are only available by purchasing the upgrade, despite Adobe's claim that InDesign's plug-in-oriented architecture would allow problems to be fixed without having to wait for a complete upgrade.

The program is available for Windows and Mac OS. Hardware requirements remain modest — a 300MHz Pentium II, or any G3, and 64M of RAM is recommended. APC tested a beta release of InDesign 1.5 on a 400MHz PowerBook G3.

A new feature allows you to conserve RAM by enabling plug-ins selectively. Sets of active plug-ins can be created for different purposes, much like using a Mac OS startup manager.

Palettes still snap against each other, but you can now dock one palette with another. However, APC found that when two palettes containing long lists of items were docked, only one of them would scroll. The Small Palette Rows option is handy when things get cramped, because it removes the separators between palette items and shows seven items in the space previously occupied by four.

It's convenient to be able to drag and drop colours from swatches to stroke or fill, but if you try to drop a colour on to text, the background colour changes but not the text colour. Picking a colour from a swatch library (such as Pantone or Toyo) automatically adds it to the main swatch. The eyedropper tool can be used to transfer settings from one object to another quickly.

There are also useful enhancements to Text Wrap. InDesign can use a Photoshop path or alpha channel to determine the edges of an irregular graphic, and even if neither is present in the image file it does a decent job of edge detection.

It's now simple to apply text to a path; this works with lines and curves, geometri-

cal shapes and even frames. This could reduce the number of steps required to achieve particular results. When the Path Type tool is selected and the cursor is positioned over a path, a small plus sign appears.

The pencil tool allows you to draw freehand lines and shapes, which are automatically converted to curves. There is provision to smooth or delete portions of the resulting shape. It works well enough for simple shapes, but designers will probably continue to import shapes from their preferred graphics programs. That said, it is handy for creating paths for text such as the 'wave' pictured.

One of the most useful changes made to the drawing tools involves the Polygon tool. If the Alt (Option) key is held down while using the Polygon tool, the centre of the new shape is positioned at the starting point. This can be more convenient than drawing the shape and repositioning its centre, and it also works with rectangles and ellipses.

The Rotate, Shear and Scale tools are still on the palette, and they are joined by Free Transform, which combines rotation, reflection, scaling and shearing. These operations can be specified numerically in the Transform palette or the dialog boxes associated with the three basic tools.

InDesign has a tendency to redraw parts of the document unnecessarily, and we found it useful to adjust the zoom setting and window size so that only the page or spread we were working on was visible. There were a few other strange problems, but restarting the program generally did the trick.

The automatic layout adjustment when changing page sizes seems to work better than when we tested a beta of version 1.0, but it still fails to create the required additional pages when the size is reduced.

A major shortcoming of InDesign is that it only supports PostScript Level 2 or



InDesign 1.5 throws down the gauntlet to QuarkXPress

higher specification printers. This could be a problem, because it isn't unusual to use an inkjet printer for proofing and one-off print jobs. Exporting the document as a PDF file and printing it from Acrobat reader works well, but is relatively slow and cumbersome. Printer and PDF styles are a timesaver, allowing sets of output parameters (eg. whether colour separations are to be produced and which PPD is to be used) to be saved for subsequent reuse.

InDesign can be customised using AppleScript or VBScript, and a variety of sample scripts are provided for tasks such as building an index or a table of contents. Of the sample scripts provided with the beta version APC tested, the ones that functioned worked well.

InDesign has some great features, and it will be interesting to see whether this is enough to persuade designers to make the change from QuarkXPress.

Stephen Withers

Contact
Phone
Online

Adobe
(02) 9778 4100
<http://www.adobe.com/>

Price

Full version not yet available, upgrade \$179

In short

This version has some useful improvements, but Adobe has a way to go before ousting Quark.

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Palm IIIc

Bulky and heavy aren't words normally associated with a Palm handheld, but they are the first to spring to mind when handling the new Palm IIIc.

The Palm IIIc is the first Palm with a colour display. It's a late stab at the colour market, which is currently dominated by Windows CE devices from manufacturers such as Casio, Hewlett-Packard and Compaq.

In terms of size, at 12.8cm the Palm IIIc is about 2cm longer than the slimline Palm V and weighs nearly 100g more. It's almost double the thickness of the Palm V and is definitely more bulky to carry in a shirt pocket.

It should be noted that while the Palm III is bigger than the Palm V, it is competing against much larger Windows CE devices. However, many of these feature voice recording, a speaker and headphone jack — none of which come with the Palm IIIc.

Then there's the battery life. Palm acknowledges that the colour screen halves the average life: from one month for the Palm V to about two weeks for the Palm IIIc.

So what does the Palm IIIc have going for it? Besides being thick, heavy and relatively battery-poor, it also costs \$100 more than the Palm V, coming in at a thumping \$899.

After using the 256-colour Palm IIIc for a few hours, it takes a while for your eyes to adjust to looking at the monochrome display of the Palm V. Most computer users are accustomed to viewing colour displays, and Palm has translated this to its latest handheld with great success. Although at first its 3.25in active matrix panel looks a little uninteresting — the background is white, the text is black, and there are small splashes of blue, red and yellow — the Palm IIIc's mini PC-like screen is bright and effective.

The Palm IIIc uses the latest Palm operating system, Palm OS 3.5. With 8M of RAM, it can store 10,000 addresses, 3,000 memos, 3,000 to-do items, five years' worth of appointments and 400 email messages. Information can be beamed to other Palm devices from the infra-red port at the front of the unit and an optional, portable keyboard can be attached for typing directly into the IIIc. Writing on the Palm screen using the unique Graffiti language is still the main way of entering data.



Like the Palm V, the IIIc has a rechargeable lithium ion battery which rejuvenates in its small cradle. While the battery may not last as long — depending on how it's used — it doesn't take long to recharge.

The standard Palm applications are all here: the address book, date book, to-do list and memo pad. Palm has thrown in a couple of other useful applications. You can download Web pages to your Palm and view them offline using Avant-Go's Web Channel Manager. Similarly, you can upload colour photos to your Palm and view them with Club Photo's AlbumToGo.

There is a mind-blowing variety of software available for the Palm, from games to utilities. Palm estimates that there are already at least 5,000 applications for its devices currently on the market, and this is increasing rapidly.

Palm purists will say colour is not necessary, but it does make the handheld computing experience more satisfying. There is a trade-off in size, battery life and price. Work out what matters most to you and choose accordingly.

Roulla Yiaccoumi

Contact	Palm
Phone	1800 350 535
Online	http://www.palm.com/
Price	\$899
In short	Fantastic, if you like colour. Not so impressive if you prefer size or battery life.



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Adaptec SCSI Card 29160

The development of SCSI seems to be tied to the limitations of the SCSI bus. The leaps and bounds over the years specifically relate to increasing the signal frequency or expanding the data path, or both. The core of SCSI controllers, and SCSI peripherals generally, seem to have stayed the same.

The bandwidth of SCSI buses have increased from 10 megabytes per second (Mps) to 20Mps, 40Mps, 80Mps and now, with the release of Adaptec's 29160 SCSI controller, 160Mps. Each doubling of speed has been achieved either by increasing the frequency of data transmission (as in the case of Fast and Ultra versions of SCSI) or increasing the size of the data path (as in the case of Wide versions of SCSI). See the table below for more details about different kinds of SCSI.

Ultra160, the new standard, is the first generation that doesn't rely on increasing the frequency or expanding the data path. Ultra160 doubles the performance of Ultra2 by sending two data bits per clock cycle (known as *double transition clocking*) as opposed to one data bit used in all previous SCSI versions. To ensure that information can travel reliably over long distances at this frequency, Ultra160 utilises Low-Voltage Differential (LVD) signalling, as does Ultra2. All previous versions of SCSI have relied on Single-Ended (SE) signalling.

Before you start getting excited about the 29160's 160Mps of bandwidth, remember this is bus bandwidth, not disk transfer speed. One of the advantages of SCSI is that it can handle up to 15 devices simultaneously. If any number of these

devices is to operate at the same time, there needs to be enough bandwidth to allow this. Ultra2 SCSI can push up to 80Mps over the SCSI bus. This may sound like a lot, but today a 7,200rpm drive can transfer around 20Mps during sequential reads, so four such devices connected to the SCSI bus will take you to the 80Mps limit. If you attach more devices, and they are accessed simultaneously (which is common for server machines), your drives won't be able to transfer at their full potential and you will have a bottleneck in your I/O subsystem.

Adaptec's 29160 adaptor pushes the maximum bus bandwidth to 160Mps. This is double the bandwidth of the Ultra2, but as more 15,000rpm drives capable of transferring about 40Mps or more appear, the Ultra160 standard will need to continue to develop rapidly to keep pace with advances in hard drive technology.

The Adaptec 29160 includes two new developments that are required to handle the new 160Mps bandwidth. Cyclic redundancy checking (CRC) data is now included as part of every transmission over the bus to ensure data integrity, and domain validation ensures that connected devices run at the maximum safest speed. SpeedFlex allows connection to a range of



devices without Ultra Wide, Ultra SCSI and legacy SCSI devices slowing down the faster Ultra160 and Ultra2 segment. As a result the 29160 provides full backward compatibility with previous SCSI standard devices, which is necessary because Ultra160 devices are only just starting to become popular.

It's worth noting that although it works fine in standard 32-bit PCI PCs, the 29160 is a 64-bit PCI card. This is just as well, because consumer machines that support 64-bit PCI adaptors are not yet available.

The Adaptec 29160 is well suited to running a dedicated server platform and a lot of fast drives. However, Ultra2 is still perfectly adequate for other purposes, such as running a high-end workstation. The 29160 is evidence that SCSI just keeps on getting better.

Ashton Mills

Contact
Phone
Online

Agate Technology
(02) 9870 3600
<http://www.adaptec.com/>

Price
In short

\$778
This is a powerful controller, which will drive SCSI storage media for the next year or so.

SCSI development

SCSI version	Mps	Cable type	Data path	Bus clock	Data bits per cycle
Narrow SCSI (SCSI-1)	5	SE 50-pin	8-bit	10 MHz	1 (asynchronous transmission)
Fast SCSI (SCSI-2)	10	SE 50-pin	8-bit	10 MHz	1 (all later SCSI versions synchronous)
Ultra SCSI	20	SE 50-pin	8-bit	20 MHz	1
Fast Wide SCSI	20	SE 68-pin	16-bit	10 MHz	1
Ultra Wide SCSI	40	SE 68-pin	16-bit	20 MHz	1
Ultra2 SCSI	80	LVD 68-pin	16-bit	40 MHz	1
Ultra160 SCSI	160	LVD 68-pin	16-bit	40 MHz	2

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Iomega USB ZipCD 650 and Castlewood Orb 2.2G USB

Removable storage is a must-have item for PCs this season. CD-R and CD-RW drives and media are dropping in price, and Zip, Jaz or Orb drives and media are also becoming quite affordable (see Price Watch, page 63).

Unless these devices are pre-installed in your system when you buy it, plugging them in can be a difficult and technically challenging chore, requiring you to dismantle the PC case, find the right end of an IDE or SCSI cable, find a spare power cable and pray that it all works. That's assuming you have a spare drive bay and power cable inside your system, and if your system uses IDE, as most of them do, you only have four devices. There's no easy way to add an IDE CD-R drive to a system that already has two hard disk drives, a DVD drive and an internal Zip drive. It's not wise to use your CD-R drive as a substitute for your regular CD or DVD drive, as it will wear out very quickly.

Two drives recently released on the Australian market — the Iomega ZipCD 650 USB and Orb 2.2GB USB External — set out to solve this problem by adding the double convenience of portability and USB: just plug it in and it goes — in theory. APC found it's not quite that simple.

The ZipCD is fairly heavy and comes in a large, sturdy blue case; you don't want to



bump the table and wreck your CD burn. Rather than drawing power from the USB port, it requires its own power supply, which makes it less portable; just physically setting it up takes a few minutes. The ZipCD isn't the greatest example of USB plug-and-play either. Setting it up requires the following steps: install the drivers, then shut down the PC, plug in the drive, and then turn the PC back on. It boots up, detects the drive, then reboots. In order to burn your own CDs, you need to install



Adaptec EZ-CD Creator, then reboot a third time. Depending on the speed of your PC, this may take 15 to 20 minutes, or longer if anything goes wrong. Installing an IDE or SCSI drive would be easier — at least that way you don't have to worry about drivers.

Although this procedure is tedious, there's nothing else to complain about. The drive is remarkably quiet, and works wonderfully, writing or rewriting CDs without a hitch, even at 4x (which is only 600K per second, well below the 12Mbps limit of USB). Unlike the IDE ZipCD, the USB drive can only read CDs at 6x, because of the limitations of the USB interface.

APC didn't have any trouble in this regard, but it's not advisable to have multiple USB devices, particularly printers or other drives, active while burning a CD. If the demand on the USB channel becomes too great, the drive won't receive enough data and you end up with a stylish drink coaster instead of a backup of your photos.

As Castlewood's lightweight and compact Orb USB External drive also needs an external power supply, it is as unwieldy as the ZipCD. The Orb USB drive is actually an Orb external SCSI drive in a case of transparent green instead of black. The only other difference is that it has a 'smart cable' with a USB plug at one end and an Ultra SCSI Honda plug at the other.

Unlike the ZipCD, the Orb's installation was fairly easy. Plug it in, install the drivers, reboot. Done. The only catch was that Windows didn't find the drivers the first time around; we eventually found them by browsing to the \ENGLISH\USB\ folder of the driver CD, which wasn't clearly explained in the manual.

The speed of the USB connection was nowhere near fast enough for the Orb drive. While the drive zipped through transferring small files, anything above a few megabytes became tediously slow. The drive is clearly capable of working a lot faster, and an IDE or SCSI connection would make much better use of the drive's speed. This is not much of a problem with a slow medium such as CDs, or a small medium such as 100 or 250M Zip disks, but filling a 2.2G Orb disk over a USB connection requires a great deal of patience.

Both these drives suffer from the limitations of the USB interface, but they're not quite as much trouble to install as their internal counterparts, and with a little effort they can be moved around from PC to PC. Both are much more expensive than their internal, parallel port or SCSI counterparts, but depending on your needs, the extra cost may be worth it.

Josh Mehlman

Iomega ZipCD 650

Contact	Iomega
Phone	(02) 9925 7725
Online	http://www.iomega.com/
Price	\$639
In short	Easy to use, but a hassle to install.

Castlewood Orb 2.2GB USB External

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Price	\$599
In short	Easy to install, but a little slow.

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*Most neurological studies support the premise that only 10% to 15% of the brain is used.

Compliance No. 14/2000/45

Canon BJC-3000 and Epson Stylus 670

When it comes to inkjet printers, people want it all. Colour, features and, above all, a low price. Canon and Epson are major players in the home printer market. APC ran the latest low-cost models, the Canon BJC-3000 and the Epson Stylus 670, head to head to see which offers the best balance of features and price.

Interestingly, the printers shared many similarities. Both support USB and parallel connections, and neither came with any cables. APC ended up using a USB Zip drive cable for testing, but you should add the cost of an extra cable when calculating the total purchase price. Both feature driver GUIs that are practically identical in terms of features and even layout, especially the actual printing screen, where it seems the only difference is the presence of an animated icon of either the Canon or Epson printer.

APC tested both printers using USB, and found that the Epson had a slight edge. Its driver picked up that we were using USB, which meant we could install and be ready to run without needing to reboot the system. The Canon printer, however, picked that we were using USB, but made us reboot anyway. Refusing the reboot just led to the printer refusing to respond.

There's money in selling printers, and there's money in selling ink. Canon has made an interesting choice for its new printer range; colours are sold as individual tanks within the print head itself. So, instead of purchasing a red/blue/yellow tank and waiting for the red to run out (or whatever), users can simply buy more red. The head will eventually have to be replaced, of course, but it still amounts to potential savings.



Both companies go to some pains to talk up the quality of their inks — with Epson it's 'Ultra Micro Dot Technology' and 'Variable-Sized Droplet Technology', while Canon goes for 'Drop Modulation Technology' and 'PhotoRealism'. Now, we're all in favour of long techie-jargon names (especially with 'technology' suffixes), but the proof of the pudding is in the printing.

Both printers were neck and neck on draft-quality quick black printing. Both support either a colour or black cartridge inserted, and both printed a test page in 20 seconds. The Epson's advantage was that its print quality was a little darker and therefore easier to read, but the extra ink makes draft printing a little less economical.

Colour printing was where things became interesting. Both printers support up to 1,440 by 720dpi colour printing. The Epson has a single ink cartridge for colour printing, and the Canon uses either a colour or photo cartridge that must be purchased separately. APC tested using two images: one poor-quality image from a digital camera, and one computer-generated image at high resolution.

In terms of speed, there was little competition — the Canon left the Epson for dead. Using the colour cartridge, the BJC-3000 took six minutes and 10 seconds to print the photo image, four minutes and 50 seconds for the high-res image. The Epson took eight minutes and 56 seconds for the photo, and seven minutes and 15 seconds for the high-res image. We also tested the Canon with its photo cartridge, which printed the photo image and managed to shave a minute off its previous time doing so. The quality of the photo image with the photo cartridge wasn't markedly better, although some colours were a little deeper.

Image quality was good for both printers, although Canon had the edge — its range of colours was much better, but the Epson had slightly superior tone differentiation. This was particularly noticeable on the high-res image, where a lot of colour depth was dropped from the image with the Epson, in favour of brighter tones. A lot depends on the image, which was why a lower-quality photo image was chosen — both printers have software optimisation for digital camera images. Here the Epson



edged ahead a little, as its driver allows for a larger range of optimisation techniques, depending on the image subject and complexity.

In terms of add-ons, the Canon also shot ahead — it supports a separate photo cartridge, as well as an add-on scanner head, but both must be purchased separately.

The final determining factor is price. The Epson costs \$349 and the Canon is \$299. Both printers are good, especially considering they're low-cost photo-capable printers, but overall, the BJC-3000 just comes out ahead of the more costly Stylus 670. Buy the Canon, or get a discount on the Epson — they're both great printers.

Alex Kidman

Canon BJC-3000

Contact	Canon
Phone	(02) 9805 2000
Online	http://www.canon.com.au/
Price	\$299
In short	A good range of expansion options at a great price.

Epson Stylus 670

Contact	Epson
Phone	(02) 9903 9000
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Price	\$349
In short	A good printer, but more costly and feature-poor than the Canon.

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Business in a Box

If you believe the ads, especially the IBM ones for its 'e-business' service, all businesses need to be on the Net now. The profit sheets of most online businesses suggest that this is more hyperbole than truth, but if you're interested in e-commerce, you could do worse than look at Business in a Box.

Business in a Box automatically generates a Web site that allows you to trade over the Internet. All you need to do is feed your company details, product catalogue, freight charges, tax rates, and acceptable credit cards into the system and a Web site will be created for you.

Business in a Box comes with 38 different graphic 'styles', with names like Arts & Handicrafts, Health & Fitness, Pets, and so on. However, some of the styles themselves have elements of bad Web design — the 'Health & Fitness 1' style, for example, uses very similar background and foreground colours, making text difficult to read. There's also the issue of the small number of styles available — do you really want your business site to look exactly like someone else's, especially if you're selling the same products as they are?

Creating a Web site in this way is much

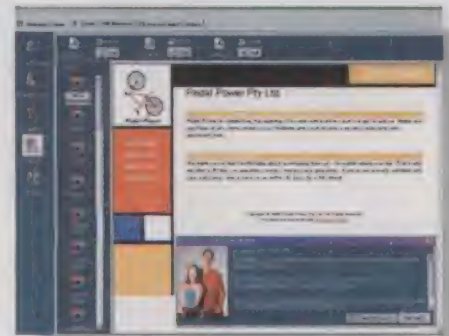
cheaper than engaging a professional Web designer, but the results are not nearly as good. Once BIB has created the Web site, you need to upload the site and have it hosted by an Internet service provider. Sausage has entered into a hosting partnership with Telstra Big Pond for this, although it can be hosted by any ISP.

Business in a Box uses 128-bit SSL encryption to protect customer data. Furthermore, security checks are performed on each transaction via Sausage's Secure eCommerce Server.

Web site transactions can be fully automated, via St George — the third partner in the Business in a Box package — which provides an online credit card merchant facility.

APC had problems getting the text export facility to work; we constantly hit an error message. This is a concern, as the last thing you want to do is manually re-enter data, especially if you have a large product catalogue.

Businesses should keep in mind that the cover price of Business in a Box is only part of the total cost of operating a business online. You also have to pay for Web site hosting, use of the Sausage



Secure eCommerce Server, and the St George automatic online credit card merchant facility.

Business in a Box is an excellent idea but it's let down by its limited design possibilities, and its tie-ins with particular services.

Thomas McCoy

Contact	Sausage Software
Phone	1800 888 568
Online	http://www.eBIB.com.au/
Price	\$495 (plus monthly hosting and transaction fees)
In short	A good idea, but not entirely ready for release.

Creative PC-DVD DVD-RAM

It's hard to believe how long rewritable DVD has been talked about. Ever since the first release of DVD-ROM, DVD-RAM drives have been just around the corner, but it's only now that they're starting to appear in the shops.

Although it has been available internationally for some time, Creative's DVD-RAM drive has finally been released in Australia in competition with Hitachi and AOpen drives. The Creative drive conforms to the original DVD-RAM specification, which requires a disk format with a 2.6G per side capacity. The drive can also read DVD-ROMs and CD-ROMs, at 2x and 16x respectively.

The Creative PC-DVD drive, according to the specs, can read and write DVD-RAM disks at 1x, or 1,350K per second — enough to play and record DVD movies. Our tests showed that the reality is a little different. Performing a timed copy of a 217M file

to and from the disk took much longer to write than it did to read. The write speed of the drive worked out at about 645K per second, well below DVD-Video data rates. On the other hand, reading from the disk was actually faster than the rated speed, at approximately 1,872K per second.

Creative currently only has a SCSI version of the drive, and it does not come with a SCSI card. It is selling for about \$888, much less than the Hitachi DVD-RAM drive. This is quite remarkable, as it's only slightly more expensive than SCSI DVD-ROM drives.

It comes with one double-sided disk (5.2G total), but with the poor market acceptance of DVD-RAM, additional media is hard to come by: checks with several major retailers revealed nothing for sale.

The other fundamental problem with getting a DVD-RAM drive right now is that

the life span of the device is likely to be short. The original DVD-RAM specification is about to be made obsolete by a newer specification, which enhances the capacity of DVD-RAM disks to 4.7G per side (the same as single-side, single-layer DVD-ROMs) and may do away with the need for a cartridge. Then, of course, there's the alternate DVD+RW and DVD-RW rewritable DVD standards, for which products should be released this year.

This drive is not a bad option for personal removable storage, although you're probably better off with an Orb drive or CD-R for now.

Nathan Taylor

Contact	Creative Labs
Phone	(02) 9666 6100
Online	http://www.australia.creative.com/
Price	\$888
In short	Cheap for a DVD-RAM drive, but the format may already be obsolete.





@

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SmartCam Professional

Videoconferencing is a growing market. The use of a Web camera to conduct face-to-face meetings is a godsend for businesses dealing with an international client base, or for those whose employees operate from remote locations.

APC looked at SmartCam Professional, a Web camera targeted at businesses. The product makes it possible to videoconference from remote locations and prepare captured footage to place on a Web site or send as a visual message in an email attachment.

You will need a free USB port to operate the colour CCD camera, and it only operates with Windows 98. Other requirements include a Pentium 200MMX with at least 32M of RAM and 80M of hard disk space. This is quite demanding, considering that a similar product currently available (the more expensive QuickCam Pro USB) requires

only 16M RAM with 50M of free hard disk space.

As is the case with most plug and play USB peripherals, installation is a breeze. An informative user manual walks you through each step and provides solutions for any problems you might encounter throughout the process.

The image created is remarkably sharp, thanks to a maximum resolution of 640 by 480 pixels and a frame rate of 30fps. This makes for clearer, more realistic images than those offered by cheaper competitors. Images can then be enhanced in terms of brightness, contrast, saturation and sharpness.

SmartCam also has an unimposing design — the entire unit is about the same size as a standard mouse and sits comfortably on top of a monitor.

The best part about the camera is that it comes as a complete package, including four software programs to enable manip-

ulation of the captured footage. One of the programs, MainActor, allows you to add special effects and titling. This could be used to prepare promotional or training material, or video for a Web site. SmartCam Works is an applications suite that can edit email clips or videoconferencing.

When SmartCam is used in conjunction with the software, it makes for a very professional marketing tool. Video for Windows and Direct Show device drivers are also included in the package, allowing the SmartCam to be used as a video input device.

The SmartCam Professional is certainly one of the better Webcams on the market. If your PC meets the installation requirements, it's definitely worth a look.

Fiona Williams

Contact	Swann Communications
Phone	(03) 9421 2811
Online	http://www.swann.com.au/
Price	\$279
In short	A high-quality Webcam with a great software package.



The J Box

What do you do if your primary business was selling Y2K software, now that particular soft-

ware boom is over? Attach yourself to the next potential boom, it seems — Greenwich Mean Time has moved on from Y2K software to MP3 players with The J Box, an MP3 player and encoder aimed squarely at the novice market. Strangely enough, it's bundled with a copy of GMT's Y2K checking software.

The single greatest problem that any MP3 software faces is that a lot of the best software is free of charge. A quick APC poll put Napster (free) and Winamp (free) solidly ahead of the pack. In order to compete, you've either got to have features that others lack, or simply market it to new users who aren't aware

of the existence of the free products. J Box takes the second route.

The J Box is based on the concept of a jukebox. However, jukeboxes should be easy to use, and The J Box isn't. You can either use a jukebox-style interface, or a smaller single line interface. The J Box is too difficult, and too buggy, to be recommended.

In order to play them, MP3 files have to be categorised, and although The J Box can search for files, you usually have to manually type in the file paths, because there's no facility to browse folders. The enclosed encoder works reasonably well, if you can ignore the error messages that pop up every 30 seconds.

The jukebox interface looks good (if a little garish), but the layout is confusing and

there's no way to simply drag files onto the box and have them play. We also noticed a significant performance hit when running The J Box, possibly because it keeps a central task launcher open, as well as whatever J Box module you're using. The installation routine removes CD Autoplay, primarily (it seems) because The J Box doesn't support it. It does support CDDA for accessing track names, but APC couldn't get it to work even once, so had to fall back on manually entering track and CD names. The ripped tracks were of an acceptable quality, but the ripper itself was a little slow.

The exterior packaging gives the overwhelming impression that The J Box is a fun and easy-to-use program. If only the contents lived up to that promise.

Alex Kidman

Contact	Greenwich Mean Time
Phone	(02) 9900 5360
Online	http://www.thejbox.net/
Price	\$39.95
In short	J Box as in junk box. Avoid.





Rob Thomas
Commercial Developer



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Richard Kippen, Managing Director, MSA-Engineering, MSA-USA, Inc.

System Commander 2000

Another version of Windows has been released and it's not surprising to find that V Communications' latest OS management package, System Commander 2000, is strongly geared toward Windows 2000 users.

Like its predecessors, System Commander 2000 detects all existing operating systems on your computer and adds them to its boot menu during installation, but its new OS Wizard is a notable improvement on previous versions. The OS Wizard fully automates the process of preparing your hard disk for almost all of the OSes supported by the package, and a second utility called the Back-step Wizard lets you revert it to its former state if you're not satisfied with the results.

A closer reading of the manuals reveals that System Commander isn't fully automated. You still need to take manual steps to ensure that those operating systems which need their own Master Boot

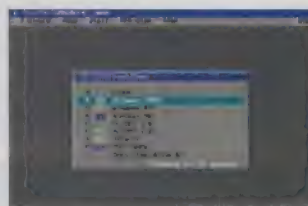
Record work correctly with System Commander.

This is because System Commander writes its own advanced MBR to the hard disk that loads into memory at startup, making the boot menu

available to the user. The boot menu is also the access point to a separate, more sophisticated interface containing the partitioning software and OS Wizard.

The OS Wizard reduces the complicated task of creating OS-specific partitions to a few simple choices about the type and size of OS to be installed. The Wizard then creates the appropriate partitions, but the user must install the actual system software unaided. Once the installation is complete, System Commander adds the new OS to its boot menu.

Despite a couple of minor glitches, APC found that the software provided a clean,

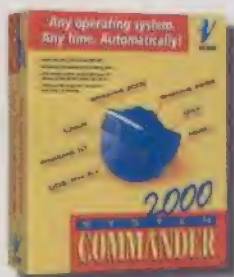


hassle-free installation of Windows 2000, and it's reasonable to assume that it would do so for other OSes with simple setup routines. However, in the case of some Unix-based OSes, System Commander may not

provide any convincing escape from the technical underbelly. In some cases, you may even want to sacrifice convenience in favour of safety by using a slightly more hands-on package like Partition Magic.

System Commander 2000 has more features and is easier to use than Partition Magic 5.0. It asks a much higher price as well — at \$129, its price is nearly double that of Partition Magic.

Andrew Colley



Contact
Phone
Online
Price
In short

Marketing Results
(02) 9899 5728
<http://www.v-com.com/>
\$129
More costly than its competitors, but easier to use.

Creative Digital TruDisplay and 3D Blaster TNT2 Digital

Creative has diverged from the video card market to produce a competitively priced LCD screen and video card combination, aimed at businesses.

There are a few things that may limit it for home use. The bundled video card is a Creative Blaster TNT2. It performed reasonably well when APC last tested TNT2 cards, but it cannot surpass the performance of today's Savage and GeForce cards. The biggest catch is that the video card and screen connect digitally; you cannot slot in a different card to replace it as the screen can't connect to a normal video output. You can use another monitor, because the 3D Blaster TNT2 Digital also has a standard video connection. However, if you don't mind not having the latest and

greatest video card and you want a decent LCD screen in the home, then this is a good option.

The TruDisplay is a 15in display with a screen size equivalent to a 17in CRT monitor, but in a much smaller box. It measures 39.7 by 38.6 by 17.9cm (h by w by d), weighs only 5.6kg and runs on considerably less power. The maximum screen resolution is only 1,024 by 768.

The software drivers and installation include the Creative BlasterControl applet for adjusting the video settings, as well as colour, resolution and refresh rates. The installation software also includes the Sonorific 3Deep and Colorific applications to calibrate the monitor further. The other applications, which include a SoftMPEG player (for VCDs), Digital FlipAlbum (for creating digital photo



albums) and an application for playing around with desktop wallpapers, are more suited to the home environment.

APC found the monitor was too bright, and the hardware controls on the front of the screen to adjust this were not very good — one for more brightness, the other less. When turned down to the lowest brightness setting, the picture was still glary, and there did not seem to be any way to adjust the contrast as the background darkened. Even playing with the BlasterControl didn't give us much joy in this regard, but fiddling with the colour setting did tone down the effect.

Darren Ellis

Contact
Phone
Price
Online
In short

Creative Labs
(02) 9666 6100
\$2,888
<http://www.australia.creative.com/>
A decent screen and good video card combination.

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Frying our brains

I noted that APC raised the question of radiation risks with regards to wireless networking devices in general (see 'A world without wires', APC March, page 73). It is good to see that public concern and awareness on this issue has not diminished. Nor should it, as ISM band products incorporating 802.11, Bluetooth, HomeRF and so on are becoming more prevalent.

The real concern from my point of view is not so much the power output of these devices (as discussed in relation to Apple's AirPort) but the frequency they operate on. Microwave ovens also operate in the free ISM band at 2.45GHz. This is the approximate frequency that causes harmonic resonance in water molecules, which vibrate and produce the heat required for cooking and warming. Like much of the food we microwave, the soft tissue of the human brain has a high water content and the brain itself is immersed in cranial fluid. The brain, as well as other organs, are susceptible to damage (ie. 'cooking') as a result of over-exposure to microwave radiation (remember the early, leaky microwave ovens?).

The situation is of more concern given the touted applications for devices such as Bluetooth: integration into mobile phones, wireless headsets etc. In essence, these applications bring a 2.45GHz microwave transmitter in close proximity to the head. How safe is this? Members of the public need to be aware of the facts so they can make an informed decision on this pervasive technology before adopting it.

**Name withheld
Internet**

Ed note: As we understand it, although microwave ovens use the 2.45GHz frequency, it's by no means the only microwave frequency

that causes resonance in water molecules. Products using the 2.45GHz ISM band are no more or less dangerous than products using other frequencies. Exposing the body to any microwave radiation involves a risk of 'cooking', which is why power level and proximity to the body are so important. We agree that it's necessary to maintain awareness and continue research into the possible effects.

Willing and cable?

Bloody Telstra! What's the point of getting "unlimited" access if they're going to limit it? Big Pond Advance has a capped transfer rate of 400Kbps downstream and 128Kbps upstream for the Freedom and Freedom Trial Plans. What if we want to watch high-quality streaming video? So much for the wired community — how in touch with the cyberspace can you be using Big Pond Advance satellite bandwidth? Once again, Telstra has decided to shoot itself in the foot.

Please let people know about this small print before they go and throw \$500 at something that won't deliver what Telstra's been promising — something that we've been waiting years for.

I guess I'm forced to go looking at Optus @Home, check all the small print (again), wait a few months to see if they'll bother to make their way out to where I am (south-west Sydney) and make sure there aren't limits there. And God help us all if there are.

**Brian Ditchburn
Internet**

Quality control

One issue that I would like to see APC follow up is that of quality control. It seems that it is being ignored in Australia.

I am a computer programmer/builder with over 30 years' experience and I like to keep up with the latest developments. Consequently, I frequently buy the latest computer programs and gadgets.

Most recently, I purchased the components to make up an Athlon 600 system. On

THREADS

from APC's Web sites

One topic that's guaranteed to stir up Net users is the threat that dialling into your ISP might soon be charged by the minute or the hour, rather than as a local call. A review of data call charging is due before the year's end, and people are worried. One contributor noted:

In cities, there's enough competition to ensure that Telstra wouldn't dare. Rural users aren't so well off.

Some felt that recent changes to the universal service obligation should go further:

The simplest way to stop Telstra trying to get timed data calls is to include untimed data calls of a guaranteed connection speed (33.6Kbps, for example) in the universal service obligation.

While Telstra's argument that it needs timed calls is based partially on a desire for local call revenue, several comments about the company's huge profit margins suggest that's not an urgent need. Not everyone is opposed to timed calls, however. Jason Backshall noted:

Timed data calls at first may seem a bad idea; however, in the end this is the way we will go (Australia is one of the only countries which doesn't have timed data/local calls). All those people whingeing should look deeper. With timed data calls, a lot of people would move over to ISDN as the pricing will be similar. With more people on ISDN, the price will fall. Eventually, ISDN will be a viable alternative for average Net users.

Want to put across your view, or see what other readers have to say? Join the discussion at <http://apcmag.com/interactive/> and <http://newswire.com.au/sboard/>.





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arriving home I discovered that the PC tower case that had been supplied was AT format instead of the requested ATX format. I returned the case for replacement, and when I returned home I built the system and switched it on. Nothing happened. Apparently the power supply was dead.

I have been unable to work for two days (due to the back injury caused by carting the case around) and now I have to take the power supply back for replacement. I don't wish to single out the particular supplier as it is just one example. What has happened to quality control in Australia? I have had to return some 20 items in the last 12 months and yet I still get caught out, whatever precautions I take.

Each time I return an item it costs me time and frustration. I have considered charging the supplier for the time it has cost me, but I don't imagine it would get me very far.

I wonder if APC has ever considered publishing information about the quality of suppliers' components as an incentive for them to pick up their act.

Bill Maidment
Central Coast, Qld

Have your say

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If your letter is selected as the best reader letter submitted to APC during May, you will receive the ultimate hard disk performance kit: an Ultra160 SCSI controller from Adaptec and a 9.1G



Ultra160 drive from Quantum. The Adaptec 29160 (reviewed in this month's First Take section on page 40) is one of the first cards of its kind on the market, and the 7,200rpm Quantum Atlas V boasts one of the highest densities of any hard disk available. The total value of the package is \$1,254. The winning letter will be published in APC July.



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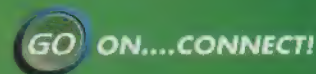


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Angus Kidman

Angus Kidman is editor-in-chief of APC and Newswire. He can be contacted at akidman@acptech.net. Angus' DisGust column is published Tuesday to Friday every week at <http://newswire.com.au/disgust/>.

It may be possible to build Web site addresses that still work if a document moves, but don't hold your breath waiting.

Not quite so robust

We've all been there. A carefully constructed inquiry using our search engine of choice appears to produce just the document we've been seeking. We click, full of eager anticipation. However, instead of a lovingly hand-coded document, up comes the Web's most disheartening phrase: '404 File not found'.

As search engine indexes become more comprehensive, they are increasingly filled with dead links. People move their files from server to server, or find their sites deleted as they change universities or jobs. Do we have to resign ourselves to the non-functioning URLs left in their wake?

Two US academics have attracted quite a bit of attention recently with their proposed solution to the problem. In a paper entitled 'Robust Hyperlinks Cost Just Five Words Each' (<http://http.cs.berkeley.edu/~wilensky/robust-hyperlinks.html>), University of California researchers Thomas Phelps and Robert Wilensky argue that it is possible to produce hyperlinks that will work even if the documents they refer to have gone walkabout.

The basic approach is simple. Any HTML document can be analysed to find how frequently each word used occurs, and that list can be compared to the frequency of the same words on the Web as a whole. Ranking the words found in a given document in reverse order of their frequency online (that is, with the most unusual words first) is a fairly simple task, and produces a term frequency-inverse document frequency (TF-IDF) list.

According to Phelps and Wilensky, feeding the first few words in the TF-IDF list for any document back into a search engine makes it highly probable that the search engine will locate that document, and not locate any others. In practice, they claim, creating a signature of the first five

TF-IDF terms will enable that document to be identified uniquely.

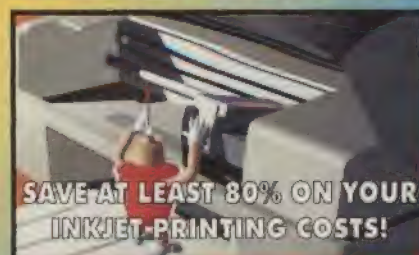
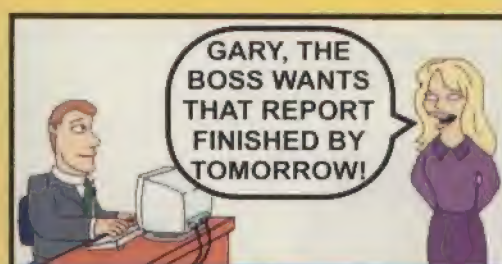
That signature can be attached to a URL to create a 'robust hyperlink'. If such a link produces a 404 error when accessed, the robust hyperlinks system would automatically pass the TF-IDF signature into a search engine and locate the document. The processing can either be handled directly by the client (a browser) or passed through a proxy before hitting the wider Web. It's also relatively easy to make such a system backward compatible with existing HTML documents and links.

If all this could be made to work, it would be a major advance for Web surfers everywhere, but there are some major problems. Phelps and Wilensky themselves acknowledge some of the obvious ones: thousands of documents don't get indexed by search engines in the first place; some sites change pages with fixed URLs frequently, making their signatures largely meaningless; and the system can't cope with non-text content (including HTML tagging and scripting).

One less obvious flaw in the system is its handling of more or less identical documents which are reproduced in numerous locations online (such as FAQs). Phelps and Wilensky acknowledge that these documents may well have identical TF-IDF signatures, but argue that "presumably any of the duplicates will be reasonable replacements for the moved document". I'm not convinced; what if you get linked to an older version of an FAQ with inaccuracies?

It seems unlikely that the industry will quickly agree to adopt such a useful innovation and work to overcome its flaws. After all, consider the general unwillingness of browser developers to cooperate, and the speed with which people moved to add popular and misleading terms to their pages simply to draw traffic. ■

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Jeremy Horey

Jeremy Horey is a senior consultant with Com Tech Online. He can be contacted at jhorey@comtech.com.au.

Do politicians understand technology?
Does it matter?

Technology leadership?

An understanding of science and technology is not usually useful for people working their way up through the ranks of a political party. If we look at the backgrounds of our politicians we will find that law is the most useful area of knowledge, but there are also farmers, doctors and unionists in politics.

This is because people who become leaders of the groups that represent farmers, doctors and workers have political skills, and those skills assist them to move from specialist groups to a place in parliament. These pressure groups have done very well in getting special consideration from governments.

However, scientists and technologists have very little political power. They don't have the types of organisations that hone their political skills. Indeed, the skills that make scientists and technologists successful in their jobs are often quite different from the skills that would make them successful as politicians.

Most of the time this doesn't matter. However, from time to time science and technology move into the driving seat. When this happens you had better hang onto your hat, because social change is likely to be fast and furious. In times like this politicians need to understand science and technology. They need to appreciate how to direct and ameliorate the changes that it's bringing. Often the techniques that normally work are no use during periods when science and technology are driving change.

We are now in such a period. Communications technology is a primary factor in some major social changes that are occurring now, and many businesses are more interested in how the technology is developing in their industry than in any other aspect of their environment.

The Internet is a good example of this. It is not the only cause, but it is overlaying and interacting with economic changes to rearrange many aspects of society.

The problem is that the politicians, who should be channelling this change so that it promotes the wellbeing of our society, have no idea of what is going on. As for the government, it doesn't even appear to have any advisors who understand what is going on.

This is a concern. It means the government is making decisions without understanding what it's doing. An obvious example is the government's attempts to regulate ISPs to control pornography, but this is trivial in comparison with what its lack of understanding will cost Australia in other areas. Politicians have not considered the implications of the Internet for the new tax system. They do not understand how the privatisation of Telstra will change control of the Internet or how the Internet is changing Australian business.

The Net enables new types of business. So far these new businesses are developing in the US. There is plenty of money and a huge population of Internet users, which means there is a lot of room to experiment.

I have worked with a number of Internet startups, and in all cases those with brand new ideas have not got off the ground. Those Internet businesses that are up and running are those with proven business models. There is little or no support for experimentation in Australia.

This means that new businesses that come here from the US won't have to contend with any home-grown adversaries. The failure of the Australian government to promote and support innovative Internet ideas compounds Australian businesses' innate conservatism. In short, we are falling even further under the domination of the US. ■

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Helen Dancer

Helen Dancer is the editor of the *Bulletin's* e-bulletin section. She can be contacted at hdancer@acp.com.au.

Nostalgia has a place, I guess.
Twenty years is quite a milestone.

Of times past, present and future

It came as something of a surprise to me to realise that I have been involved with APC for a period approaching a quarter of my life. This realisation, as the magazine was approaching its 20th anniversary, left me feeling nostalgic.

Technology has changed in so many ways, but it's the personal experiences that really stand out. I remember attending the decidedly underwhelming launch of Compaq's first home PC (a hard drive was an optional extra) and the launch of its network printer range, at which a Compaq printer was outperformed by the Hewlett-Packard printer it was supposed to beat in live tests in front of the press. It was inconceivable back then that fledgling Compaq would not only rival but surpass industry heavyweight IBM and become the owner of two pillars of the industry, Tandem and Digital.

My first Two Bits column was written on my PC in my own little SOHO (well before that acronym gained currency), whipped onto a floppy disk, and hand delivered to the magazine's offices in Bondi Junction. Email? Who had ever heard of email being used outside the computer science labs of universities?

In 1992, I travelled to the US to write a series of profiles on infotech luminaries. For the trip I borrowed a notebook, a then state-of-the-art 386 that resembled a brick, but processed information slightly faster. Paranoid about losing data along the way, I backed up every article I wrote on floppy disk. Later, in Montreal airport, security suspected it was a bomb because it wouldn't boot up (the battery was flat), and I had packed all the cables and power pack into my suitcase to save carrying weight. The plane was unloaded, power cable retrieved, system booted up and I was finally allowed on the plane.

Not only are security guards in airports now very comfortable with travellers carrying computers — indeed they look askance at those who are the exception to the rule — but some airlines even provide power jacks to accommodate passengers who want to work across the Pacific instead of watching the movie.

Since its inception, right up until Jeremy White's editorship, the magazine relied on lifting rights from Ziff-Davis publications in the US to provide much of its testing, reviews and analysis. We used to wait frantically for the SyQuest disks to arrive every month, and plan the content of the magazine from shadowy outlines faxed from the other side of the world. The Internet revolution meant not only that we no longer relied on post and poor-quality fax, but also that there was patently little point in republishing information from other sources once it became readily available electronically.

Indeed, the history of the magazine and its relationships with its information sources — contributors and the industry — reflects quite accurately how technology has accelerated aspects of business we take for granted. APC has always focused on the cutting edge and what it means. To many readers of this 20th anniversary special those technologies will now seem hilariously antiquated.

Clinton administration Internet guru Ira Magaziner says that we're in the most fortunate of positions; not on the cusp but fully in the thick of a major revolution, equal in magnitude to the agrarian or industrial revolutions. My hope for the next 20 years is that public policy becomes as innovative as the technology it governs.

For a complete archive of APC Two Bits columns, see <http://apcmag.com/twobits/>.

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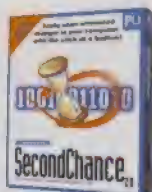
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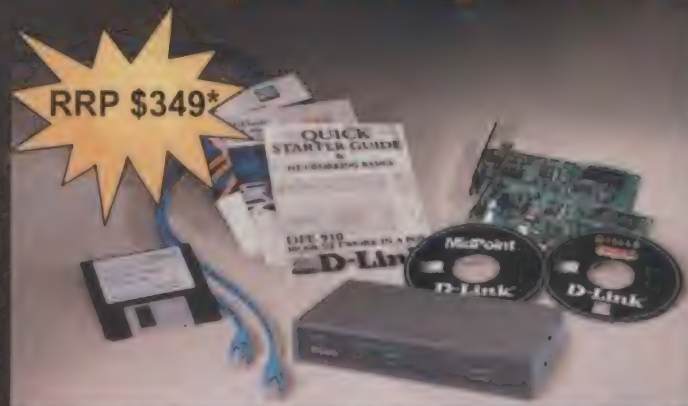
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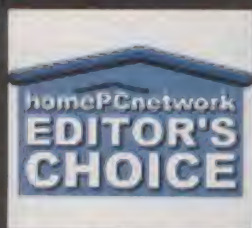
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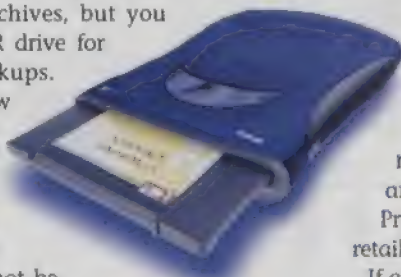
Your choice of removable storage depends on your needs and how much you're willing to pay.

You can take it with you

The ability to store and retrieve vast amounts of data instantly is one of the miracles of the digital age. However, the failure of technology could mean losing anything from the monthly financial figures to a few years' worth of your life's work. That's why backing up is vital, especially if you use your PC to generate your income.

This month's Price Watch examines some of the popular storage media on the market. APC asked retailers for prices of six types of storage media and weighed up the prices against their pros and cons as storage solutions.

From a cost-per-megabyte point of view, CD-R storage eclipses all other options. A blank CD-R disc only costs about \$3 and holds 650M of data, which means it costs about half a cent per megabyte. CD-Rs are great if you want to warehouse an extremely large amount of data as physical archives, but you wouldn't use a CD-R drive for regular system backups. CD burners are slow and the burning process is too sensitive to be considered reliable. You also need to remember that CD-R discs cannot be rewritten and that can undermine their cost advantage. If your backup operations are reasonably large (500M to 600M), you'd need to buy a new disc every time you did a backup. You can rewrite CD-RW discs, but they're more expensive and the question of reliability remains.



In terms of raw storage costs, Jaz and Orb media are more expensive than CD-Rs, but they don't suffer from the same limitations. They can store 2G of data (Orb disks can store 2.2G), they can be rewritten with impunity and their associate drives are reliable and simple to use. Jaz and Orb are primarily designed for backup operations, but there are also portable versions of each that you can use to share data between your laptop and your desktop. This kind of quality comes at a high price. At \$195 for a single Jaz disk and \$79 for an Orb disk, you're paying about 10 cents a megabyte and 3.5 cents a megabyte respectively in terms of raw storage costs.

It's fair to compare Jaz and CD-R for data storage because they both have similar initial costs. A SCSI version of either drive will cost you \$600 to \$780 (assuming you don't already have a SCSI card). Orb drives cost considerably less.

It's possible to buy an external Orb drive that will connect to your parallel port for \$459 and at 3.5 cents a megabyte, its ongoing costs are also more palatable; but Price Watch didn't find many retailers with Orb drives in stock.

If all of these options are a little on expensive side and you just want a disk that can outperform those dinky floppies you've been cursing for years, then you might consider a Zip drive. Zip drives are available in 100M and 250M formats and compare well with Jaz drives for features. In the 250M format, a Zip drive costs

About Price Watch

Each month, Price Watch examines variations in retail pricing and service. Investigations are conducted anonymously, either by telephone contact with retailers or through pricing details supplied on their Web sites. Prices and specifications provided here are as quoted by retailers; while we assume these are correct, we cannot accept responsibility for errors or omissions. The responsibility rests with sales staff to provide adequate information, as their employer would expect them to do with every customer. Readers are advised to always obtain a written quotation prior to making any major technology purchase.

about \$290 to \$330, depending on the interface style you prefer, but their ongoing costs are high as each disk sells for \$35 (19 cents a megabyte).

Finally, you shouldn't evaluate removable storage just in terms of cost. Also consider the reliability of the media, the performance of the drives and how widespread they are. The last point is particularly important: what's the point of having portable disks if nobody else has a drive that can run them?

For a complete archive of APC Price Watch columns, see <http://apcmag.com/pricewatch/>.

Retailer	Contact	Zip 100M	Zip 250M	CD-R 650M	CD-RW 650M	Jaz 2G	Castlewood Orb 2.2G
Adelong Computers	(02) 8344 3190 http://www.adelong.com.au/	\$24	\$35	Verbatim 10 for \$25	\$7 (various brands)	\$225	N/A
EcomComputers	(02) 9299 0022 http://www.ecomcomputers.com.au/	\$19	\$35	\$3 (various brands)	\$10 (various brands)	\$199	\$79
Harvey Norman	(02) 9948 4511 http://www.harveynorman.com.au/	\$19	\$35, 10 for \$317	\$3, Kodak 10 for \$26, Sony 10 for \$26, Verbatim 10 for \$25	\$12.95 (various brands)	\$196, 3 for \$505	\$79
Rite Price Computers	(03) 5672 4887 http://www.ompac.net.au/~rpc/	\$19	\$35	\$2 (various brands)	\$8 (various brands)	3 for \$511	N/A

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Behind every great offer is a long list of waiting customers. By Roulla Yiacomini

Red hot delays

Every so often, a 'must have' offer comes along which attracts a lot of attention. As APC's Service & Reliability has found, unprecedented demand for a special offer can result in a long list of frustrated customers waiting for the business to deliver.

No matter how politely it is worded, the response from the business involved seems to be 'Join the queue and wait or have your money back and forget it.'

As we have always said, if a deal seems too good to be true, then you might want to steer clear of it. We're not talking about dodgy deals here. We're talking about legitimate offers from reputable businesses. Businesses with sizable resources may be able to anticipate how popular a certain offer will be and quickly implement coping strategies. If the company is not prepared, it can mean hiring new staff at short notice to cope with the current demand and deal with the angry, delayed buyers.

In January, a group called Virtual Communities launched a deal whereby low-income families could purchase a PC and Internet package through their union for \$9.50 a week over three-and-a-half years (see APC January, page 17). IBM supplied the computers and Primus fulfilled the Internet access side of the deal.

Demand for the offer was high and a backlog of orders accumulated. APC received the following letter from one customer:

Dear APC,
I am writing on behalf of my brother Gary regarding the problems he is having obtaining a computer package from Virtual Communities.

Gary posted his application form on December 8 and received a letter confirming receipt on December 23. This letter mentioned there would be a slight delay in processing.

He then received a second letter on January 4 stating his application had been approved and that he should receive a letter of offer — which confirmed the delivery date — shortly.

On January 24, Gary rang again to find out what was happening with his



computer package as he had not received the letter of offer.

He was told that this letter was really a contract which he had to sign before his computer could be delivered. He was also informed that his application was still being processed, even though he had already received a letter saying it had been approved.

The next day, Gary spoke to Virtual Communities who told him the contract would be sent out that week and he would have his computer by mid-February.

On January 28, Gary rang again to see if the contract had actually been sent out. He was told his application was still being processed and that no contract had been sent out. He told the representative that he had a letter saying the application had been approved, but was told there was no record of it as at that stage the company did not have the software to process the applications.

A week later, Gary received a phone call from Virtual Communities saying the contract would be sent out. There was still no sign of the contract a week after the phone call, so Gary called again to be told no contract had been posted. The

same reason was given as before — the application was still being processed. A deposit for the package had already been taken from his credit account.

Gary called the following day seeking more information, but was asked if he wanted to cancel the application as the company had received more than 70,000 orders.

On February 14, Gary called Virtual Communities to speak to someone in administration. He was told someone would call him back. After not hearing from anyone, Gary called again on February 18. He was told his application was still being processed and that they had to check that he had local call access for Primus Internet. As he lives in the Perth metropolitan area, this was not a problem.

He was told it would be another two weeks before the contract would be sent out, and then a further six weeks before the computer would be delivered.

As you can see, this has proved to be a very frustrating experience. Virtual Communities is still denying knowledge of the letter sent on January 4, even though Gary has the letter in hand. The standard answer to any inquiry seems to be that

the application is still being processed. At this stage, Gary is wondering if he will ever receive his computer package.

Dianne Edwards
Huntingdale, WA

APC forwarded the letter to Virtual Communities and received the following response:

Dear APC,

We have contacted Gary and by coincidence, Gary had received his loan contract in the mail the day we called him. There is no problem with his application apart from the delay in processing his loan contract.

By early March, three-quarters of our 10,000-plus customers will have either had their PCs installed or have had a delivery scheduled.

Two groups of customers have experienced delays: those who require outbound calling to follow up incomplete information, and those in remote areas who don't have local call access to the Primus network.

To alleviate the problem, we have recruited a large number of additional staff who have been coming onboard over the last four weeks.

We have chosen to hold the applications of people who don't have local call access

until we can mail them and clearly explain what this means and what their options are. These include continuing with their delivery or holding their order until they have a closer POP. This mail will go out next week. Primus has activated 48 new POPs during February, and has a major regional POP rollout in progress, on top of an already comprehensive regional POP network which covers more than 90% of the Australian population.

Our program is on schedule and we have commenced deliveries as forecast. We do not have stock or logistics problems and the constraints in our administration area are now vastly improved. A new application received today will take six to eight weeks to fulfil as planned and communicated to our customers. By mid-March, we will be offering instant, over-the-phone application and credit approval which will halve the fulfilment cycle to three to four weeks.

It's important to remember that this project has required complex systems integration between Virtual Communities, our customer management centre UCMS, Primus, IBM, Mayne Nickless, AEI Warehousing and AXA. The development and rollout of these systems has gone very smoothly.

Virtual Communities remains committed to its vision of supplying low-cost PC and Internet solutions that are affordable to the vast majority of Australians to ensure they are not left behind in the information age. We will do whatever is required to meet the demands of our customers. Any customers that are not satisfied with the progress of their application can cancel their order with a full refund.

We regret the inconvenience to some of our customers who have waited longer than we would have liked.

Ed Smith

General manager, Virtual Communities

Have you ever responded to a promotional offer to find the company could not immediately supply you with the goods? Did you choose to wait — and for how long — or go elsewhere? Email me at ry@acp.com.au or write to Service & Reliability, APC, PO Box 4088, Sydney NSW 1028. Letters may be edited for length or clarity. We regret that all letters cannot be personally answered. For a complete archive of APC Service & Reliability columns, see <http://apcmag.com/service/>.

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Affordable broadband access may finally be on its way — even to the bush. By David Braue

New bandwidth strategies

Businesses of all sizes will soon benefit from the rapid development of Australia's Internet bandwidth market. A host of new telecommunications carriers are using wireless technologies and carefully considered partnerships to quickly commission high-speed network backbones that will lower costs across the board — and finally extend broadband network access far outside Australia's central business districts.

The expansion comes after years of network development in major CBDs. During this time, companies such as MCI WorldCom, AAPT, PowerTel and Primus Telecommunications sought direct access to the largest possible base of businesses by running fibre-optic cable under the streets of Sydney, Melbourne and Brisbane. Smaller capital cities and regional centres have been disadvantaged by these decidedly market-driven strategies, which generally add regional extensions as an afterthought.

Realising that the CBD markets are largely saturated with bandwidth, a number of carriers are planning to develop far more wide-reaching networks.

In March, for example, FiberTel announced it will spend about \$167 million over the next year to build a fibre network linking Melbourne and Adelaide with Perth. In the process, the company will finally provide an alternative to Telstra's monopoly over expensive rural ISDN and frame relay connections. This could herald a rapid drop in bandwidth pricing in regional centres such as Bendigo, Mildura, Port Augusta and Kalgoorlie.

FiberTel, which recently merged with licensed carrier Amcom Telecommunications, plans to create another major telecommunications carrier able — as only Telstra, Optus and a couple of other companies already are — to carry traffic from one end of the continent to the other on its own network. This will give the merged company significant clout as a supplier of bulk bandwidth to regional ISPs, as well as making it a strong contender for the business of government departments and corporations with mining and rural interests.

The early part of this year has seen a frenzy of similar activities, as six new carriers — Neighborhood Cable, West Coast Radio, Pulsat Communications, Global Dial, iiTel and Swiftel — have been licensed by the Australian Communications Authority in the last six months.



Wireless technology allows carriers to set up their own networks without having to pay for costly right of way. This is exactly how Soul Pattinson Telecommunications (SPT), a subsidiary of Newcastle-based NBN Television, has been able to quickly commission a 1Gbps network backbone running from Brisbane, along the NSW north coast and down the Hume Highway to Melbourne.

Instead of paying for expensive fibre, SPT has kept its costs to a minimum by using microwave technology to relay data between more than 50 standalone towers perched on hilltops along its route. Using this topography, services can be quickly provided to remote areas simply by commissioning additional towers within line of sight of the existing network.

By the time its northern and southern spurs are joined this month, SPT's network will provide new levels of bandwidth to regional centres including Tamworth, Armidale, Albury, Bendigo, Shepparton,

Orange, Dubbo, Lightning Ridge and other areas where most fibre-based providers are loath to tread. SPT believes that becoming the first business to provide high-speed data services to these areas will give it a hammer lock on local service revenue that will more than pay for the company's relatively inexpensive infrastructure.

"Capital cities are fairly well populated with providers now, so if you're looking for new business or additional revenue streams you need to look outside of capital cities," said SPT general manager and NBN secretary Michael Simmons.

Victorian service provider OMNIconnect has a similar network in that state, using microwave links to shuttle data between regional areas including Mildura, Swan Hill, Gunawarra, Ballarat, Horsham, Ararat and the distant NSW towns of Wentworth, Balranald and Wakool.

The flexibility and low cost of wireless technologies will also make them attractive in metropolitan areas, where most businesses are still struggling with the relatively tight constraints of Telstra's high-cost ISDN and DDS services in the lead-up to its introduction of ADSL services in August.

Although Telstra and Cable & Wireless Optus both have high-speed cable modem connections available in some parts of the country, availability is still limited and the pricing models are still developing. This has opened up significant opportunities for fast services such as AAPT's Local Multipoint Distribution Service (LMDS) wireless technology to take up the slack. Its freedom from the expense of fibre and the complexities of accessing Telstra's copper local loop, could mean more entrants chase the lucrative wireless local access market instead.

As wireless access services proliferate over the next two years, businesses of all sizes — and eventually even consumers — will finally get easy access to plentiful bandwidth, wherever they happen to need it.

For a complete archive of APC Corporate columns, see <http://apcmag.com/corporate/>.

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MP3 PLAYERS

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When talking about MP3 players, most people immediately think of software such as Winamp or MacAMP, but unless you have a notebook with these installed, your mobile options are fairly limited. In the past year or so, portable hardware MP3 players have come to the fore and a wide range of devices are appearing on the market. APC amassed a swag of players: personal devices as well as car players and hi-fi stereo components. Then we played the music . . . **By Darren Ellis**

M P3 is an Internet success story. A decent audio compression codec (coder/decoder) was decided upon and utilities to support the new codec were written and made available on the Net. This led to the widespread proliferation of MP3s, and they quickly became the latest Internet buzz. With buzz comes exploitation, and it wasn't long before nefarious Web sites with free downloads of top artists began to proliferate.

Why MP3? The answer lies in three areas: file size, audio quality, and simplicity of creation. CD audio takes up a lot of room. A typical CD holds 74 minutes of audio, or 650M of digital data, which equates to roughly 8.8M for every

minute of audio. A three-minute song recorded in digital format on a hard drive (usually as a WAV file) can take up more than 30M of disk space.

The MPEG-1 Audio Layer-3 (or MP3) codec in a standard MP3 ripper strips out everything in a WAV file that the human ear cannot hear; for instance, the first 100 milliseconds after a loud noise and low/high frequencies out of human hearing range. This effectively cuts the file down to about one-twelfth of its original size with little loss of quality. Although hyped as a CD-quality format, MP3 still lacks the depth and range of CD audio.

Technicalities aside, ripping your own MP3s is easy. You need a CD-ROM,

some hard drive space and one of the numerous rippers available on the Internet (many of these are on our cover CD). A three-minute CD audio track can be an MP3 on your hard drive within 30 seconds. This is where the MP3 copyright problem arises. Because they are easy to rip, of high quality and have small file sizes, MP3s can be easily distributed on the Internet.

Are MP3s dodgy?

Depending on what you're doing with your MP3s, then yes, MP3s can be dodgy. Many people make copies of CDs and recordings they already own, which

MP Freedom



makes for a persuasive argument: 'I bought a copy of CD X, so I should be able to make copies of it for my own use'. The law is unclear about this use of MP3s, but there are legal and ethical arguments on both sides.

On the pro-MP3 side is the argument that 'Fine, some MP3s may be illegal, but you never tried to ban dual-cassette players or CD stereos that had tape recording capabilities.' Record companies argue that if you want a tape copy of a CD you already own, then you should buy a genuine cassette copy. In Australia, you can legally make backup copies of anything you have paid for, but you cannot distribute them.

However, many people are not merely making backups or copies. They're downloading whole CDs at a time off the Internet, and have no intention of paying royalties to the copyright holders. Utilities such as Napster (see page 95) further blur the lines of what is acceptable by distributing an MP3 file sharing utility, combining it with a chat program and calling it 'community' software.

Soon, this will all come to an end. The SDMI (secure digital music initiative) is a consortium of international businesses, many of them record companies, that are concerned about the widespread illegal dis-

tribution of music on the Web. The SDMI has been working on a way to prevent the wholesale copying of CDs. What it has come up with is the SDMI standard. This still allows users to copy and rip CDs for personal use, but a digital watermark embedded within the files will prevent them from being played electronically or on SDMI-compliant players. This will only work on post-SDMI music and files; the millions of MP3s currently on the Web will still be playable, even on SDMI-compliant devices.

The players

Ever since Diamond won the widely publicised bout with the RIAA (Recording Industry Association of America) over the distribution of its Rio portable device, the number of new portable devices has increased greatly. Many are still only available overseas, but distributors such as Rome MP3 are more than happy to ship orders internationally.

The good news is that more and more players are now entering the Australian market, and they have faster download speeds and greater capacities. APC has split the reviews into two sections: the first is personal and portable players, and the second comprises hi-fi components and car players.

The one thing that is immediately obvious when you look at the portable MP3 players is that they are tiny. These are the smallest and lightest music players on the market, far smaller than a Walkman. A less obvious advantage is the battery life. As the portable players read from data stored in flash memory, either internally or from a flashcard upgrade, there are no moving parts. As a result, some players can run for more than 12 hours on a single AA battery.

Another bonus of having no moving parts is that the players are relatively jump free. Unlike a Walkman or Discman that can run into trouble if shaken or bumped, MP3 players can take a beating (although this is not recommended) and are perfect for jogging or cycling.

The car and stereo component players are a little different — they either rely on an internal hard drive or a burnt CD-ROM of MP3s to function, and their storage capacity is far greater. Whereas a portable unit normally has 32M onboard with an option to expand to 64M with a flashcard, the players with hard disks are limited only by the size of the drive. Theoretically, you can have a few thousand MP3s if you have a large enough drive. If that doesn't make you want to read on, nothing will.

PERSONAL PLAYERS

Creative Nomad 64

The Nomad 64 is an attractive MP3 player. It is a rectangular shape with rounded ends, and all of the buttons are tiny points arranged along the sides of the player.

The unit slips into a cradle for recharging the two bundled AA Ni-MH batteries and for connecting to the PC via the parallel port. The batteries last about five hours fully charged, but if you use normal alkaline batteries, they will last nine hours.

The software is reasonably straightforward, but it can be a little confusing. Because the player also stores file types other than MP3s, unless you specify that you are uploading MP3s, the file extensions will be cut off and you won't be able to play them. All files are stored in 8.3 format; depending on the naming convention you use for your MP3s, this can be very annoying. The LCD shows the name of the file being played, but if you keep your MP3's ID3 information updated it will scroll that instead.

The Nomad 64 also comes with an FM tuner that can store up to 10 station presets.

The tuner is quite strong on picking up signals and includes a frequency scan function. It can also function as a voice recorder. The pick-up is not as hypersensitive as the D'music's is, but it is fine for voice recording.

The Nomad's audio is excellent; it has good bass and high-range sounds. Although it includes three equaliser presets, they didn't actually contribute a lot to the overall audio quality. With its sleek look, functional design and quality audio the Nomad 64 is good value for money.

The Nomad II player, which supports USB and multiple audio formats, should also be on the Australian market by the time you read this, but wasn't available to us for review.

Contact	Creative Labs
Phone	(02) 9666 6100
Online	http://www.australia.creative.com/
Weight	106g
Price	\$599
In short	An excellent player with lots of capabilities.



Diamond Rio 500

Diamond has a good reputation when it comes to MP3 players. It was one of the first to market with the original Rio, and stood up to the Recording Industry Association of America (RIAA), which frantically tried to quash distribution of the unit. The RIAA petition was overturned, and this paved the way for other manufacturers.

The Rio 500 is the second generation of the Rio range, and comes with twice the onboard storage capacity of its predecessor. The player has a totally different design to the original, and the next-generation Rio due later this year promises another total shift in aesthetics. The Rio 500 comes with 64M onboard, and with an extra 32M flash memory upgrade (APC tested a unit with this), you can increase the capacity to 96M — much more memory than any other player reviewed here.

Storage is not the only area where the Rio excels; it also has much faster downloads. The Rio 500 was the only MP3 player with a USB connection, which means that it downloads music faster. With the bundled software, it is also compatible with

iMacs and G3 Macintoshes. The software is comprehensive and is an example of how easy MP3 players should be to use. You can differentiate between internal and external (flash) memory, and even juggle track positions around on either media.

The LCD has room for two lines of song and artist titles. It has the added bonus of being backlit, unlike any of the other players. You can also browse through the stored tracks using a combination of the browse button and the volume wheel. The sound quality is high, although there was audible distortion at higher volumes. The volume button/wheel also controls the graphic equaliser that has three presets and a customisable setting. The Rio 500 is also available in a solid colour finish.

Contact	Diamond Multimedia
Phone	(02) 9640 2346
Online	http://www.rioport.com/
Weight	121g
Price	\$599; 16M card \$159, 32M card \$235
In short	Competitively priced with plenty of memory.



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PERSONAL PLAYERS

DreamCom E-Sounds

This is the smallest player in this review, and it has a great-looking design. The main play buttons are arranged in a circle on the front of the player, and the volume, equaliser and repeat controls are across the top. E-Sounds fits comfortably in the palm of your hand and is easy to operate using your thumb.

Everything about the E-Sounds shows that the manufacturer took care to make it a value-for-money purchase, right down to the software, which has a distinctive E-Sounds styling to the interface. The software lets you upload and download MP3s, rip CDs and catalogue your music collection.

The audio was exceptionally clean with every kind of musical genre we played on it, even at maximum volume. The bass was still rich and thumping with techno, and the orchestral pieces were clear and sharp in the classical MP3s. The player has three equaliser modes: pop, rock and classic. Each works very well.

This tiny player runs off a single AA battery that should give you about 10

hours play time. The unit comes with 32M of storage, which can be expanded via flash memory to 64M and connects directly to the PC via the parallel port.

Three things let this player down. First, its LCD is small, and can only show track times and the occasional three-letter word. Considering that most of the other players have larger LCD screens that will scroll through the MP3 or ID3 information, this is an oversight.

Second, the scan times for skipping through sections of MP3 tracks are slow, and don't become faster the longer you scan.

Third, like all the other models reviewed besides the jazPiper, there is no pouch or belt clip for carrying the player, although this is not such a hassle because it fits easily into any pocket.

Contact	mp3.com.au
Online	http://shop.mp3.com.au/
Weight	101g
Price	\$259
In short	An excellent player, with high quality audio and design.



jazPiper

The popular jazPiper is the only portable unit reviewed here that comes with a belt clip. A new version coming out soon also includes FM radio. It is one of the larger units here, slightly wider, thicker and heavier than the Rio 500. Like the Nomad 64 and D'music, the jazPiper can record voice; and it was the best at this task. The pick-up recorded very clean audio, even over a few metres at normal conversational levels. The unit can also store phone numbers.

The player reviewed by APC had a few glitches. The sound was excellent until we flipped through the DSP (digital signal processing) settings. The settings were good at enhancing different aspects with the three settings (classical, pop, rock), but once we went full circle and back to no DSP, the sound was more like a tinny AM transistor. However, when left alone the audio was outstanding.

The headphones bundled with the unit were very clear and crisp, and with no DSP they were great. The player has a rounded LCD similar to that of the Nomad 64, and a small oval button for playing and

skipping tracks. This control is smaller and a better one-thumb operation than the D'music.

The player has 32M of onboard memory and a flash memory slot for an extra 32M upgrade. It also uses a parallel cable to download from the PC. APC noticed that the player — which is capable of carrying other file types — will not let you upload MP3s from the unit to a PC, as an attempt to enforce copyright protection. However, you can download any MP3 you choose to the player. We also noticed that the MP3 upload/download software is the same as the E-Sounds player's, with only minor embellishments to make it jazPiper-like. (E-Sounds also stops you from uploading MP3s to the PC.) The other bundled software is the JetAudio player and ripper from Cowon.

Contact	mp3.com.au
Online	http://www.mp3.com.au/
Price	\$349
Weight	129g
In short	A good player, at a reasonable price.

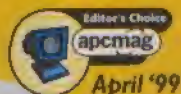


And the winner is....

DIAMOND VIEW

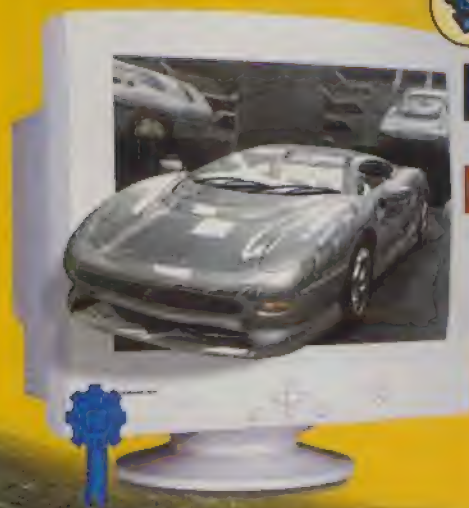
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PERSONAL PLAYERS

Pine D'music

The D'music player did not leave APC reviewers with a terribly good first impression. It has a decidedly cheap look to it, particularly with the plastic finish on its housing. All of the MP3 players reviewed were small and lightweight, but the D'music actually looks fragile, which has more to do with its construction than its petite dimensions. On the plus side, it is reasonably priced, and unlike most of the other players, it has a large LCD capable of displaying full song titles.

With a circular button configuration similar in look to E-Sounds', the D'music player is a slightly larger unit. It fits easily into your palm or pocket, but it does not come with a belt clip (a feature only found in the jazPiper).

The D'music has 32M of onboard memory, and also comes with a slot for a flash upgrade to 64M (sold separately). The software is the usual Windows Explorer-style interface; you just select the songs and then upload them to the player. As with the other bundled software pack-

ages, the D'music also differentiates between the standard memory and the flash memory expansion.

The audio is average, but the inclusion of a graphic equaliser with a few presets is a nice touch. Interestingly, the player seemed more comfortable with the nuances of classical music than with rock or techno.

Like the Nomad, the D'music has voice recording. It is extremely simple to use and records very well, except that the microphone pick-up is far too sensitive. It picked up the movements of the player in our hands, and loud clicks when pressing buttons. Leave it alone on a desktop, and it records quite well.

Contact	Tandy Electronics
Phone	(02) 9830 9222
Online	http://www.tandy.com.au/
Weight	101g
Price	\$299; 32M card \$195
In short	A good budget option, with a large LCD and a graphic equaliser.



Pontis MPlayer3

When APC first looked at this player (see APC October 1999, page 44), we were hesitant to recommend it until a faster and larger model became available. According to the distributor, Toptec, these faster and larger capacity units are still to arrive from Europe, but the current model is selling well.

The MPlayer3 unit is not bad at all, and as far as portability goes, it is relatively unencumbered with gadgetry. The player will operate for about 12 hours, running off two AA batteries. The storage capacity and download speed are the only shortfalls.

Music is stored on two 16M MultiMedia Cards (MMCs) which can only be written to one at a time. As songs cannot span cards, (no player with two memory sources can do this) it effectively cuts the storage into the two 16M chunks, rather

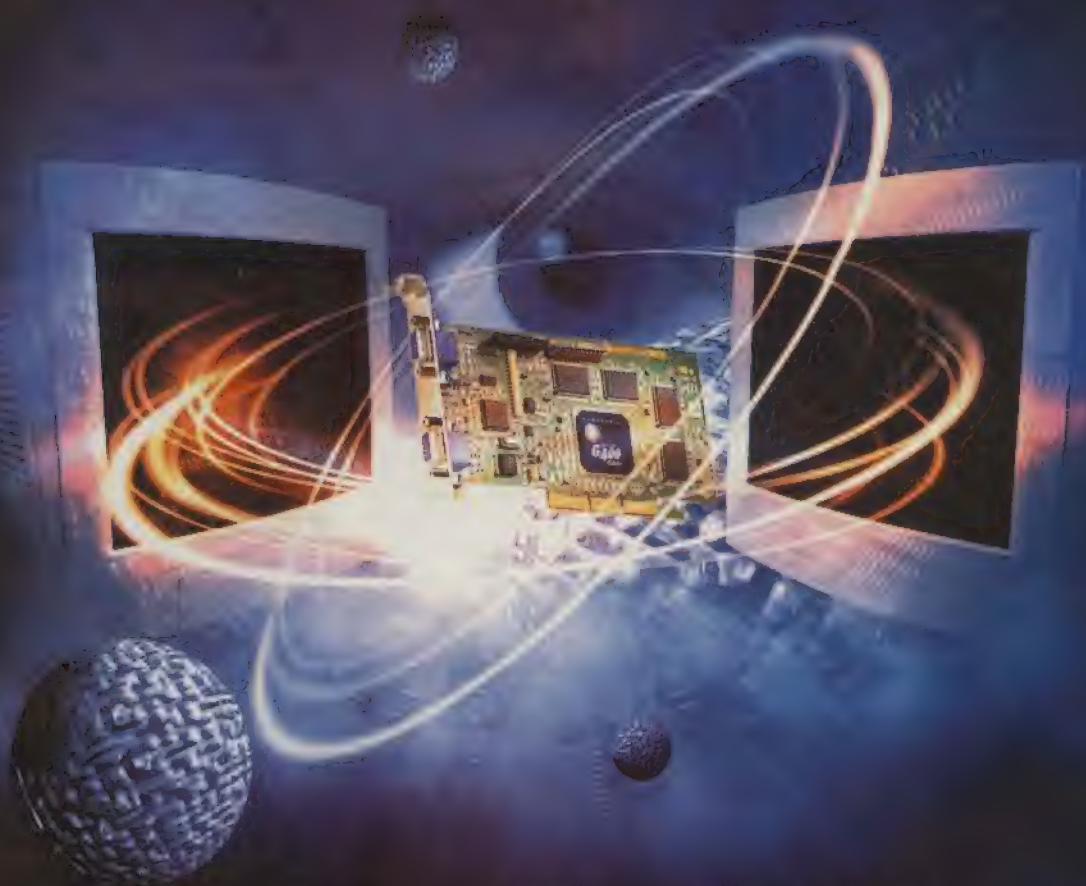
than a 32M whole. This is not such a problem with the other players with 32M chunks, but a mere 16M on each card is annoying. Future versions will have two 32M cards. An advantage of the cards, though, is that the player has no base memory to speak of. Theoretically, you could have multiple cards with different playlists, but at \$94 each this could prove very expensive.



The LED software (LED is an acronym for load, encode, decode) is simple to use and is similar to the Rome MP3's utilities, except that it can be used with both PCs and Macs. It can rip CDs, and is used for uploading MP3s to, or wiping MP3s from, the MMCs. Upload time is quite slow, as this is done through the serial port, but the next version will feature USB uploads, and will be 50 times faster.

The unit has the usual play, scan and skip buttons, and a simple LCD. The audio is excellent, but falters at maximum volume. It's a cheaper alternative to some of the other players, but lacks the speed or capacity to equal them in performance at the moment.

Contact	Toptec
Phone	(08) 8365 0650
Online	http://www.toptec.com.au/
Weight	156g
Price	\$298 (plus \$12 postage and handling); extra 16M cards \$94 each
In short	A good player, but hold off until the new units arrive.



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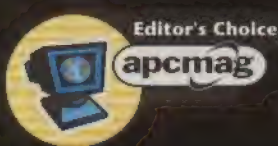
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MP3 HARDWARE

Rome MP3

A PC loves gadgets and when the Rome MP3 landed on the reviews desk, it caused a minor stampede and much oohing and aahing. Straight from the pages of the 'what a bloody good idea' book, the Rome MP3 takes the tape unit used in early CD-to-tape-player adaptors, and fitted it out with MP3 capabilities. APC's reviewers were not sure whether to place this player in the portable or the MP3 hardware category. In the end this category was chosen, as the Rome MP3 provides more freedom and features than a mere personal player.

The unit is lightweight (76g) and because it is cassette-size, it slips easily into your pocket. The Rome MP3 runs on a Ni-MH rechargeable battery which lasts about six hours and comes with its own charger. The player looks and feels exactly like a cassette. All of the buttons have a low profile and are recessed along the top and one side of the player, including the headphone jack.

Used as a personal player, the Rome MP3 feels fragile (due mainly to the low weight of the unit), but the audio is

excellent. The equaliser is basic, but does a good job of filtering out ambient noise.

The best thing about the Rome MP3 player is that it not only looks like a cassette, it also functions as one. It works in any tape player, whether it's in a hi-fi component, Walkman, stereo or car tape player. The player needs to be turned on to function as a cassette, and like the portable CD player adaptors before it, it uses a magnetic head instead of tape. The Rome MP3 works with the tape player's fast forward and rewind buttons to skip songs; press forward then play and it skips ahead.

The software and download speeds (from the parallel port) are typical of many of the players reviewed here, and the unit has 32M onboard memory. This cannot be upgraded, but future versions will have a smartcard slot.

The Rome MP3 is not commercially available in Australia, but you can order it from the company's Web site and it will be posted out for a shipping fee. The total price comes to about \$470.



Contact	Rome MP3
Online	http://www.romemp3.com/
Weight	74g
Price	\$US249.95, plus \$US35 postage and handling
In short	Competitively priced and flexible.

TerraTec M3PO

The M3PO is not a character from *Star Wars*, but it is the only MP3 hi-fi component reviewed here. It does not use any form of internal storage for the MP3s but plays music from burnt CDs instead. If you are going to use a player like this, then you need to organise your MP3s into folders. The M3PO can dig deep within folder trees, so you can sort by genre, then artist, album and finally song.

The M3PO is also capable of playing normal CDs, but it is best to think of the unit is as a CD-ROM drive with MP3-decoding chips and minor memory capacity for saving information such as playlists and bookmarks. Although the M3PO does not come with any storage capacity of its own, you have the option of installing an IDE hard disk of any size. The catch is that to get the MP3s onto the disk, you have to either place them there prior to installation, or copy from a burnt CD. The player allows you to format drives, create, delete and move folders and also lets you search directories for certain tracks.

The whole player is menu-driven from the main wheel/button on the front. It can be a bit fiddly getting the menus selected correctly, and the wheel can be touchy at times, but you can toggle the wheel's mode of operation from being a selection tool, track skipper or searcher. As it is a component, there is no volume control apart from the one for the headphone jack. Annoyingly, this is buried within the menu, and curiously it goes right up to 13.

The wheel/button is not the only way to navigate and use the M3PO; it also comes with a remote control. The LCD is very

bright and is capable of displaying a lot of text, but was jittery when scrolling through long filenames. It only has the two right/left outputs on the rear, but the M3PO is an excellent CD/MP3 playing alternative to a portable player, especially if portability is not a concern.

Contact	Innovision
Phone	(03) 9853 3824
Online	http://www.innovision.com/
Price	\$995
In short	A little expensive, but better if you add a hard drive.



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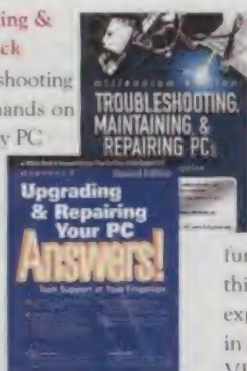
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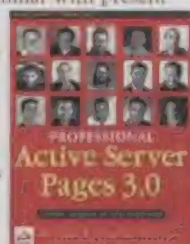


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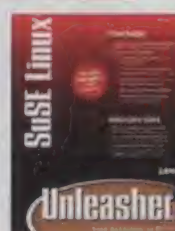
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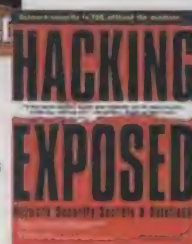
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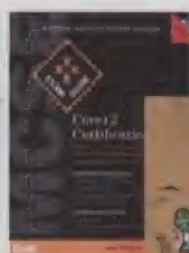
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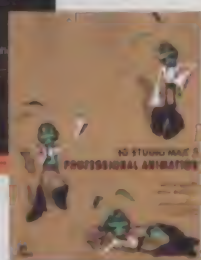
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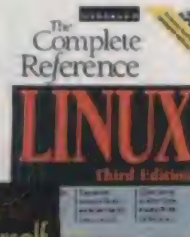
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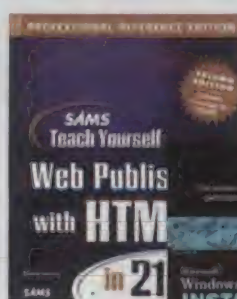
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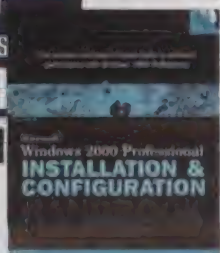
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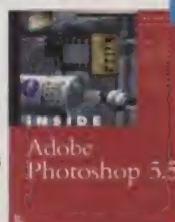
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MP3 HARDWARE

Xeenon MP Shuttle II

This is the first car MP3 player APC Labs has seen, and hopefully it won't be the last. The MP Shuttle II is the only MP3 player reviewed here (aside from the Terratec M3PO) that does not rely on flash memory to store music — it uses an IDE hard drive, which is not included in the package. The advantage of this is that you can fit any size drive you want. (FAT16 and FAT32 are supported, as are long filenames.) With the average MP3 being about 3.5M, a 2G

hard drive can store roughly 600 MP3s. The maximum number of MP3s you can play on the MP Shuttle II is limited only by hard drive size.

Similar to a CD stacker, the main unit resides in the boot of the car, and the controls and adaptors are in the front near the stereo. The main unit has a removable hard drive rack, and there's a spare for installing in your PC. There's no special software to speak of, any hard drive will do.

the car, the power, control and audio input cabling has to travel to the front of the vehicle. This is fairly standard stuff with boot-based MP3 and CD players, but the MP Shuttle has two major differences: it is powered from the cigarette lighter socket, and can use a tape adaptor to play music through the stereo. This means you don't need a professional to wire the MP Shuttle II into your car's electrical system and stereo, but then you don't get a professional result.

The controller itself is easy to use, and has a big LCD and large buttons which cut down on fiddling when you're driving. The audio is quite clear and crisp, and if you're worried about hard drive damage, the main unit has shock pads underneath.



The wiring concept behind the MP Shuttle II is a little confusing. From the main unit in the boot of

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\$1,138
An excellent way to bring MP3 to your car, but full integration would be preferable.

How we tested

Obviously, the only way to test an MP3 player is to play MP3s with it. APC listened to the same MP3 files on each unit to ensure proper comparisons across the board. We listened through the bundled headphones, a set of high-quality headphones and set of Altec Lansing speakers and subwoofer. The MP3s played were from a wide range of genres — from techno to classical to rock. If it was possible with the unit, we tested and configured the DSP/EQ settings to suit.

We also ran through the bundled software, as each player had more to offer than just a way to download and upload music. Some included cataloguing applications for large music collections, others included MP3 rippers. Each unit was weighed with batteries and the bundled headphones.

In the case of the TerraTec M3PO, we burnt MP3s to a CD-ROM, and with the Xeenon MP Shuttle we installed a hard drive and plugged it into a car.

Editor's Choice

Diamond Rio 500



Highly commended
Creative Nomad 64
Rome MP3

With such a diverse selection of players, it was extremely difficult to select a winner. There were so many things to sway us: the Nomad 64's styling and audio; the Rio 500's 96M capacity; the Rome MP3's audio quality and flexibility; the M3PO's hi-fi appeal and the E-Sounds' design.

Although it's not the cheapest player available, we awarded the Diamond Rio 500 Editor's Choice because of its high capacity and excellent audio. Other players can offer 64M of storage, but only the Rio still had a slot available for a further 32M flash memory upgrade.



The Creative Nomad 64 comes with 64M of storage, but it also takes up your smartcard slot. The FM radio, voice recording and good looks also make this player a good value option.

The Rome MP3 impressed us with its flexibility. Not only is it a portable MP3 player, but it works in any cassette player.

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MPEG-3 MPEG-2 MPEG-4 MPEG-7

Sending pictures and sounds through time and space is big business. So big that most of the world's largest and richest businesses spend their time doing just that: broadcasting, narrow-casting, datacasting, transmitting and networking aural and visual data through the air, across phone lines, down fibre-optic cable, and lately, through the Internet. However, sending that information quickly and efficiently is something that even the experts are still wrestling with. Hence the need for MPEG.

The Moving Picture Experts Group (MPEG) was founded in 1988 — well before the Internet existed, at least as we know it today. It was set up as the working group of a joint technical committee formed by the Geneva-based International Standards Organisation (ISO) and the International Electrotechnical Commission (IEC). MPEG's mandate was to develop standards for the coded representation of moving pictures, audio, and a combination of both.

It was five years before the group generated its first standard. When it started work, demand was mostly for terrestrial broadcast of digital video. The requirements for broadcasting over the Internet were not considered.

Despite this, it is MPEG's first standard (MPEG-1) that is still making IT headlines today, through the ubiquitous Audio Layer-3 or just MP3.

MPEG-1 made its debut in 1992 as a standard for an efficient means of storing and retrieving moving pictures and audio

from storage media such as CD-ROMs (it is used in VCDs, for instance). Despite complicated intellectual property rights, MPEG-1 remains in use and sits comfortably with the MPEG standards that describe other aspects of compression or operate at higher levels of abstraction.

MPEG-2 is also a standard for compressing video and audio data, but it goes a significant step further to define the "syntax and semantics of bit streams in which digital audio and visual data are multiplexed". Multiplexing is an important concept in the world of MPEG, as it's the means by which different data streams can share time and space.

MPEG-2 is the standard adopted by Digital Versatile Disk (DVD) video and High Definition Television (HDTV). It is demanding on hardware at the decoding stage, but the new wave of set-top boxes such as Sony's upcoming PlayStation2 are bound to increase MPEG-2's life span.

Whatever happened to MPEG-3?

You could be forgiven for confusing MP3 with MPEG-3. MP3 refers to the audio compression standard described by the third of three layers defined by MPEG-1 and 2. Strictly speaking, this should be written as MPEG-1, Audio Layer-3, but that's a bit of a mouthful for marketing purposes.

The different layers of the MPEG standards provide increasing levels of complexity and efficiency. Audio Layer-3 is the

most complex and is directed towards low-bit-rate applications because of its sophisticated method of extracting irrelevant data based on a 'psychoacoustic' threshold. That is, the compression system is designed around the way people actually hear, rather than the way they would hear if they could take in everything in a parcel of sound.

The truth is, there is no MPEG-3. Work began on MPEG-3 to accommodate the emerging needs of digital television, but it became apparent that MPEG-2 could do the job and the team was disbanded to pursue other projects. The other MPEGs, MPEG-4 and MPEG-7, are of most interest to Net users.

MPEGs 5 and 6? Apparently there was division in the ISO ranks as to what the new MPEG should be after 4, given there was no 3. Should it be 8, as in the logarithmic sequence, 1, 2, 4, 8? No. It was decided that the new kid was sufficiently radical for it to follow its own sequence and the people at MPEG went for 7.

MPEG-4

The ISO granted MPEG-4 official standard status last year. It was designed specifically for the Internet and low bandwidth communications media and is well timed to bring order to the squabbling between the proprietary compression systems presented by companies such as Microsoft and RealMedia. It is based on a proprietary technology: Apple's QuickTime 4.

MPEG has redefined audio and video. It is the progenitor of standards such as MP3, DVD video and digital television. New MPEG standards will revolutionise multimedia delivery over the Net. Craig Kirkwood explains how.

MPEG-4's most defining features are that it's object-oriented and it supports interactivity — two attributes that mirror the general development of information technology. MPEG-4 is object-oriented in the sense that the aural and visual components that make up a scene are treated as a hierarchy of media objects.

Primitive or elemental objects are at the leaves (bottom layer) of the hierarchy. Elemental objects, such as films or vector graphics, may be grouped with any number of other objects to form compound objects. Such grouping allows the author to construct complex scenes, and enables the user to manipulate meaningful sets of objects. For instance, a sequence may include three objects: a video of a speaker, a video of the background and an audio track.

MPEG-4 describes media objects in vectors, which means they're mathematically scalable and can be manipulated on the client side. It also means the point of view — an important concept in motion pictures — can be altered without needing to request more data from the sender. Consider the implications of that for low-bandwidth transmission: rather than send every pixel of every frame to the client, the 'server' (or broadcaster or sender) need only send the elements of the scene and the instruction kit for building the scene locally.

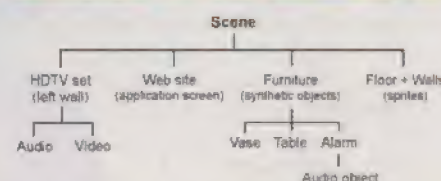
MPEG-4 in its elemental form, compared to earlier frame-based compression systems, is similar to the distinction between vector-based file formats used for

static images such as the Encapsulated Postscript Format (EPS) and bitmapped file formats such as the Tagged Image File Format (TIFF). With EPS, the image is scalable, so the file size remains small no matter what size the image is printed or displayed on the client side. Vector-based files, however, have the distinct disadvantage. They cannot contain complex shading or continuous tones such as those used in photographs. If you need to send static, continuous tone images across a narrow bandwidth channel, you need to use a bitmapped compression system such as JPEG (see 'JPEG 2000', page 84).

MPEG-4 is about scenes containing objects, not just the objects themselves, and it's about creating those scenes in a way that leaves the task of composition to the receiver.

Building the scene

The ability to build scenes by instruction is not new. The Virtual Reality Modeling Language (VRML), from which MPEG-4 borrows heavily, has been used to create interactive 3D environments since 1994. MPEG-4 takes the VRML concept a significant step further by creating a system for the integration of both 2D and 3D images. Furthermore, it uses binary code to optimise the system for use in low-bit-rate environments, making it 10 to 15 times faster than text-based VRML instructions. Not only is the code smaller, but it supports real time streaming, which means the scene can be rendered



An example of an MPEG-4 scene composition. Each object in the hierarchy can be sent separately over the Net, and each can have its own QoS indicator.

on the fly before the file has finished downloading.

The MPEG-4 language for describing and changing scenes is called the Binary Format for Scenes (BIFS). BIFS commands can add or remove objects from a scene, or change the visual or aural properties of an object without actually changing the object itself; for instance, the colour or texture of a ball may be altered or animated in response to input from the user. It is also possible to impose natural images over synthetic objects; for instance a face may appear to move like a waving flag, as if it were projected on that flag.

MPEG-4 supports a certain amount of meta-information to allow intellectual

JPEG 2000

The Internet community has always had to be content with just three options for graphic files: CompuServe's Graphic Interchange Format (GIF), the Joint Photographic Expert Group standard (JPEG) and, more recently, the Portable Network Graphics (PNG) format. GIF files are fine if you don't have too many continuous tones or blends and you don't mind being limited to 256 colours. This is not a great limitation for Web use, considering that browsers only reliably display 216 discrete colours. GIF supports animation and transparency, which has kept it popular despite a major, and apparently unsolvable, problem: Unisys owns the LZW compression system used by GIF and the licence fees are exorbitant.

JPEG files are in their element when an image contains areas of tone or blended colours, such as in digitised photographs. The lossy compression system works most effectively when there are plenty of pixels that can be extrapolated without appearing to degrade the quality. The quality can be varied to strike an acceptable balance between file size and image integrity. JPEG files do not support animation or transparency.

The PNG format is the W3C's recommendation; it is royalty-free and tantamount to a standard. Although infrequently used by Web developers, it is superior in many ways to both GIF and JPEG.

PNG uses a lossless compression system, which means there is no degradation over multiple saves, and supports an impressive 48-bit RGB colour, although it is currently implemented in a less glamorous 24-bit version in current browsers. PNG has no facility for animation, but it does offer a variable transparency system and a more sophisticated method of interlacing. The main problem with PNG files is that they're usually too big for Web work without some clever tweaking.

The solution everyone is waiting for is a vector-based format that is scalable on the

client side and contains both image data and meta-data. That may well prove to be the XML-based Scalable Vector Graphics (SVG) format, but in the meantime the people at JPEG are working on another version of their file format which may just keep us satisfied until a scalable solution is finally agreed upon. JPEG 2000 won't be formally approved until 2001, but the compression algorithm was finalised late last year, which means the first part of the draft is more or less ready to go. According to the ISO group in charge of the standard, it should compress images up to 40 times better than the current JPEG standard.

JPEG 2000 uses a complex system called 'wavelet compression' which is significantly more sophisticated than the Discrete Cosine Transformation (DCT) that is currently in use. Wavelet compression divides the image into tiles or rectangular arrays that contain relative portions of the entire image and the compression data required to decode it. These tiles can be extracted and reconstructed independently.

The standard also defines a 'codestream' which organises data relating to each tile into packets. Packets contain a tile header, consisting of a series of markers and marker segments, and information about the various mechanisms required to locate, extract, decode, and reconstruct every tile. At the beginning of the codestream is a main header with information about the entire original image.

JPEG 2000 has a host of features that will make it very attractive to Web developers. It already

boasts 24-bit colour and dramatically higher compression rates without visible loss. A proposed second part to the standard will usher in add-on features such as animation, a separate algorithm to render text and a facility for encrypted copyright branding. The protracted standards process is still ahead and full browser support will need to be in place before the new format can be used, but by all accounts it will be worth the wait.



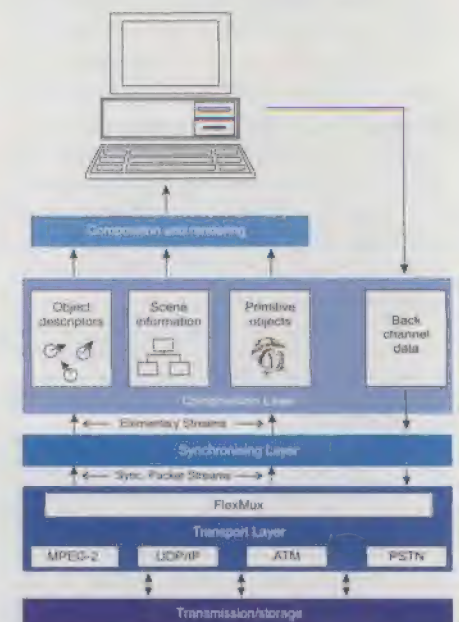
An image of a shaded ball. The JPEG and JPEG 2000 files are the same size, but the latter is much higher quality.

property rights to be assigned to individual media objects. This gives the author copyright over the objects by providing a means of assigning unique identifiers.

Sending the scene

MPEG-4 describes a complex system of multiplexed layers and 'streams' for the transmission of scene information. The scene data is arranged as packets which are placed in 'elemental streams'. There may be several streams associated with a given object, and each stream will typically contain descriptors to determine the resources needed to decode the data, along with an indication of the quality of service (QoS) required to transmit it successfully; for example, the maximum bit rate, the error rate, or the priority.

Each of the data packets is time-stamped, allowing a dedicated synchronisation layer to keep the multiple streams synchronised. Two further layers, the TransMux (transport multiplexing) and Delivery Multimedia Integration Framework (DMIF), handle multiplexing of the data at the transport layer, but DMIF is only defined as a session protocol. The delivery technology used would be defined by other standards such as MPEG-2, PSTN, ATM and so on, although MPEG-4 does define an optional interface called FlexMux, which is happy to handle some of the legwork.



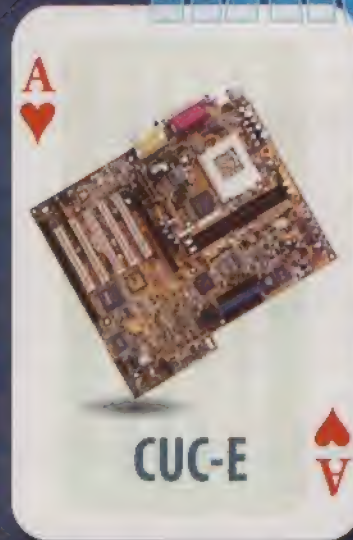
Transmission of an MPEG-4 stream

MPEG-7

MPEG-4 takes us from merely compressing frame data to mapping scenes as

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compound, interrelated objects by allowing the receiving system to compose the objects according to the user's requirements. That's a bit like the difference between sending text and graphic information to a particular system, and sending HTML tags that let a system's browser render the information. Now there's another big step to take.

Just as XML ushers in a level of abstraction to markup which enables you to ascribe meaning to documents or data through context-specific tags, the Multimedia Content Description Interface (MPEG-7) offers a standard for describing multimedia content via meta-information. It is scheduled for approval in September 2001.

While aural and visual data are just fine for consumption by human end users, there is little hope of a data processing system making any sense of it. How, for example, could a computer search for the bad guys on a surveillance system? How can a computer describe a visual scene verbally? What about search engines seeking a particular scene with or without naughty bits? How can you convince a VCR to automati-

cally record when *The Bill* comes on? It's all in the tags.

The main tools in the MPEG-7 swag are descriptors, description schemes and the language which draws it all together: the 'description definition language' (DDL). Descriptors identify particular attributes of objects in a scene such as colour, texture and shape as well as filmic parameters such as camera angle, tilt, pan and zoom. Description schemes are functionally similar to XML schemata in that they model the objects and define the context they are presented in. They also specify rules for the types of descriptors that can be used in a given description, and the relationships between descriptors or between other description schemes.

The DDL defines the syntactic rules to express description schemes and their interpretation. The DDL is not an XML document type definition (DTD), but it probably would be if it weren't for the complex politics of standards bodies versus the World Wide Web Consortium (W3C). As the W3C technically owns the XML schema, the ISO, and thus the MPEG people, don't have the liberty to

make extensions or revisions of the specification. It also means they would be dependent on the W3C's development schedule to come up with the goods.

The solution was more or less to go it alone. DDL follows XML syntax, but is under no obligation to remain faithful to it. This is where standards clash with conventions; most of the IT world is embracing XML as the lingua franca of data interchange, but it isn't really a standard and that does give the industry a certain vulnerability. The ISO cannot be exposed to that vulnerability because it plays the role of a kind of judiciary and sets down the rules for the rest of us to use (or not use).

Actually, there are several other languages (or syntaxes, to be correct) in use that are based on XML. Probably the most significant of these is the Synchronized Multimedia Integration Language (SMIL) which has gained a wide user base following its implementation in RealNetworks' RealPlayer G2. SMIL is limited compared to MPEG-7, but it remains to be seen whether MPEG-7 will be out of date by the time it's released next year.■

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INSTANT MESSAGING

CHATTER BOXES



ICQ has long had the jump on all other instant messaging services, but new contenders seem to pop up every day. Each promises the world at your fingertips. You can enjoy conversations in real time and exchange voice messages with friends the world over, without being hit by a hefty phone bill. In a bid to see how well they deliver, **Fiona Williams** tests the top six instant messaging services.

In the beginning, instant messaging was a way for computer aficionados to meet each other and stay in touch without having to resort to either phone calls or physical contact. A spin-off from the successful IRC chat rooms, the concept of instant messaging is quite simple: once two or more people use the same Net-based instant messaging service, they can set up a network of friends or colleagues (many services use the US slang 'buddy list') and chat away instantly.

Email provides a handy way to keep in touch, but communicating by email tends to lack spontaneity. There is no guarantee of the recipient's presence and there is nothing as tedious as waiting for an email to be acknowledged. Therein lies the beauty of messaging. The most obvious advantage over email is that the conversation is immediate; the software notifies you when your nominated contacts are online and in turn you can expect a response in the amount of time it takes them to think of one. Of course, if someone fails to respond to your attempts to make contact while you are both online, it reflects more on your relationship than the software. Should this develop into a pattern, you would be well advised to find yourself a new contact.

Instant messaging is not just the domain of people with too much time on their hands. The opportunities it presents to businesses are endless, eliminating the nuisance of missed calls and an endless stream of voicemail in one fell swoop. Employees can avoid playing annoying cat-and-mouse games with email and voicemail by using an instant messaging service to determine when their colleagues are available. Most messaging programs can restrict messaging to a specified group of users, which is particularly handy in the workplace. The benefits of messaging for business have not gone unnoticed by Net-based messaging services; many boast of their business potential. However, Net-based services cannot always guarantee the level of security many businesses require. Only an internal messaging system can provide high security and tightly restricted access.

The success of instant messaging is evident in the fact that it is now a standard feature of all major Internet portals. There are countless instant messaging options, the most popular of which is ICQ. Mirabilis originally led the charge in offering instant messaging to the masses with ICQ. AOL acquired ICQ, along with Mirabilis, in 1998. AOL also operates a separate Net-based messaging service, and others are

available from MSN, Yahoo and the CMGI-owned Tribal Voice. Lotus has targeted the corporate sector with Sametime, which is designed specifically for use behind a firewall. In the following pages, APC reviews all these programs, assessing how easy to use each service is, what levels of technical support and security are available, and how useful the service is.

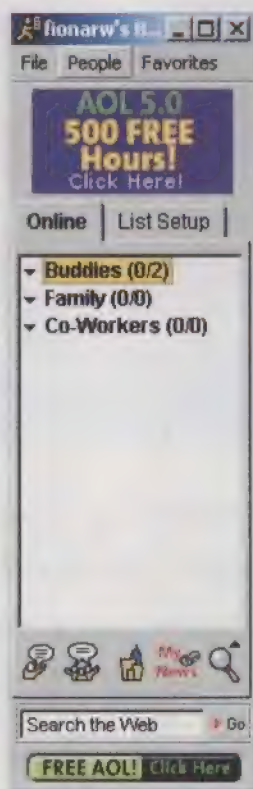
It's encouraging that all programs reviewed, except for Lotus Sametime, are currently available as free downloads. All are included on this month's cover CD, so you can try them out and see which one works best for you. Your choice may well depend on which systems are used by your friends, colleagues and acquaintances, as not all programs are interoperable. Of the programs reviewed, only Tribal Voice's PowWow and Lotus Sametime allow you to contact members of other services (MSN Messenger and AOL Instant Messenger respectively). AOL has been widely criticised for fiercely opposing the attempts of other instant messaging services (notably MSN Messenger) to work with its AOL Instant Messenger service. The IETF has made attempts to create a fully interoperable instant messaging standard (the Instant Messaging and Presence Protocol), but this isn't yet in widespread use.

AOL Instant Messenger 3.0

It's easy to get the hang of AOL Instant Messenger (AIM) 3.0. The service boasts a host of features, but the instructions are easy to follow. A New User Wizard walks you through the basics of instant messaging, including creating your first buddy lists and making yourself visible to the world at large. The online help provides more detailed information.

Although it is used mostly for recreational purposes, AIM's file transfer features have good potential for business use as well. Future versions will have a specialised chat screen for portable Internet devices.

AIM also includes an option for loading and saving buddy lists, which enables you to share contact details. This is handy for work use, but it raises security questions,



because there is no way to control whose list you are on. People can add you to their buddy list without your knowledge, and if you are on someone's buddy list, they will be able to tell whenever you are online.

Should this prove a problem, there are a range of privacy options that allow you to block specific people from contacting you. You can also restrict the list of people from whom you will accept messages.

AIM also includes a unique Warn feature, which sends a warning message to undesirable or offensive chatters to shape up their act. If the warnings don't work, AOL may boot them out of AIM and revoke their rights to use

the service (albeit temporarily).

As AOL blocks the use of AIM with other instant messaging services (except Lotus Sametime), you are restricted to communicating with other AIM users and AOL members. Not that this means a shortage of people to talk to — AIM boasts some 45 million members. You just need to ensure that any potential buddies among your online contacts are also members of this service. Surprisingly, you do not need an AOL email account to use AIM.

AIM does not allow you to leave messages for offline buddies. This is annoying, because you have to wait for them to come back online before you can make contact. The only alternative is to leave an email message, but AIM does not provide this option.

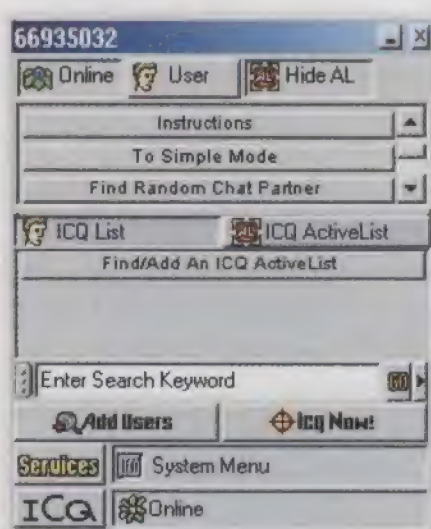
Contact	AOL
Online	http://www.aol.com/
Price	Free
In short	Big on features, but not compatible with other free messaging services.

ICQ 99b beta

The big daddy of instant messaging services, ICQ got the ball rolling when it came up with the concept of Internet chat in 1996. Now it boasts some 42 million users and can be run on almost any operating system, even Windows CE. This is refreshing, as some of the services tested by APC only work on a limited number of platforms. The program can also be installed behind a proxy server or firewall, subject to configuration.

Once installed, the service assigns you an individual number that identifies you to other ICQ users. It is up to you to provide further details about yourself, depending on the amount of personal information you wish to make available to the ICQ-using public. Any details you choose to provide are listed on various ICQ directories, for the perusal of potential contacts and those keen to chat.

The security features are of a high standard for a Net-based messaging service. Users can choose to 'ignore' messages and requests to chat, or go online in Invisible mode so as to be undetected by others.



Individual messages may also be screened for profanity if you desire.

ICQ permits you to create messages offline, and also to leave messages for the people that you have missed online.

ICQ is packed with features, as reflected

in the interface. Driven by icons and lacking in details, ICQ can be tricky for the novice to navigate. Help is at hand in the form of an online instruction guide that acts as a tutorial for new users.

The program can be run in either Simple or Advanced mode. Simple mode displays only the basic features, such as the System Menu and the option to add contacts to the buddy list, but even in Simple mode, the icons take some getting used to. By switching to Advanced mode, you can access a Services option. Highlights include message archives, to-do lists and email access. One curious feature of Advanced mode is that it allows you to send a request to a buddy to phone you. The point of this is not entirely clear, but it does suggest that instant messaging has come full circle.

Contact	ICQ
Online	http://www.icq.com/
Price	Free
In short	ICQ has stood the test of time, and provides good privacy options to users.

Lotus Sametime 1.5

Net-based instant messaging services are useful for quick communications. However, they pose security concerns for businesses because they involve communications which extend beyond firewalls. In an attempt to address security concerns, some internal messaging systems have been developed specifically for business use. Lotus Sametime is one example; it allows messaging to take place behind a firewall.

Sametime comes complete with a server, client and a range of application tools. The server supports the T.120 standard and is designed to work with any browser or Lotus Notes. When tested by APC, the setup process was fairly straightforward. After installing the server, APC downloaded the Sametime Connect client and began chatting.

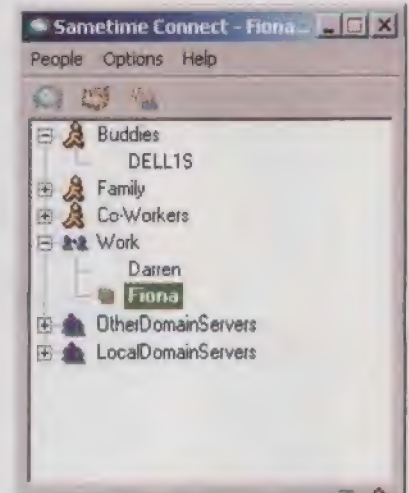
Sametime works well for those connected to a Sametime server, but by its very nature it is an isolated service. Although this has advantages, it means staff can't use the service to communicate with business contacts, unless they also run Sametime.

Lotus Sametime is the only service that

has managed to get the nod from AOL for compatibility with AIM. It actually works, so businesses that fork out for the Sametime package can potentially access a wider instant messaging contact base.

Sametime allows employees to take part in online discussions and meetings with colleagues, and to conduct remote presentations using T.120. Security is a major feature of the product. There is constant prompting for user authentication and passwords, and the administrator can determine access privileges at any stage. Online meetings can also be password protected and restricted to a select group of invitees only. As with other services reviewed by APC, users can also select their level of visibility.

The level of peace of mind and security offered by Sametime comes at a price. The product is quite expensive, retailing for about \$7,500 for the server and \$31 for each client licence. This might be hard to justify for businesses content with email and the odd missed telephone call, but it would be well worth a look for companies with many remote workers and a need for high security.



Contact	Lotus
Phone	1800 252 408
Online	http://www.lotus.com/
Price	\$7,692 (server) and \$31 (client)
In short	Designed for corporations, Sametime is expensive but secure, and application sharing is thrown in.

MSN Messenger 2.1

It would be ridiculous not to expect Microsoft to have instant messaging software. MSN is a relative newcomer to the messaging arena, but it has racked up many a download since joining the fray. It is offered to all Hotmail users at registration, which has no doubt helped its popularity. You must be a Hotmail user in order to use MSN Messenger.

Of all services tested, it was the easiest to download and took the shortest amount of time to set up. This is because the program lacks many of the features offered by the other services reviewed. If all you want is simple instant messaging, MSN Messenger will do the job. It is instant messaging at its most basic. There is online help, but not many aspects of the service need any further explanation.

One advantage MSN Messenger has over its rival AIM is that users can check for incoming email from the interface. However, this is really the only special feature of the service.



Although it's relatively small compared to the other programs reviewed, MSN Messenger provides a similar level of security. Privacy options allow the user to determine who can see their online comings and goings. It is also possible to keep track of the contact lists on which you appear, and you can also choose to be invisible. Businesses would appreciate the security features of the program.

Because it's so basic, MSN Messenger would appeal to first-time instant messaging users. It gives you a decent overview of how to set up a contact list and send messages. However, since Net-based instant messaging services cost nothing to download, you might want to start with one that has a better selection of features.

Contact	MSN
Online	http://messenger.msn.com/
Price	Free
In short	A very basic instant messaging service.

GST.

THE SIMPLE TAX

Understanding the GST volume 1.127.0: Implications of the GST on the retail cost of computer equipment¹.

Understanding the new goods and services tax is for many people as 'simple' as acquiring a 1st class degree in advanced astro physics from Harvard University.

All you need is a firm grip of accountancy, some specialised mathematical skills, the knowledge garnered from plenty of painstaking research into GST rulings, and any fool can work out the implications of the new 'Simple' tax on a complex piece of modern technology.

Grab a copy of the new Goods and Services tax rules, pick a product and give it a go. By the time July 1 hoves into view, you will possibly know the exact savings you will make give or take a cent.

Do remember however, to make allowances for selective tax values on hardware, software, local content, third party technology and of course any price fluctuations in the mean time.

Talking of the meantime, you may have to make do with that old 486 and Dot matrix printer from the good old days, but we're sure you'll be ok!

The following text represents just a small part of the information available relating to GST and Tax reform

GST AND TAX REFORM

1.1 GST AND THE TOTAL TAX REFORM PACKAGE

On 8 July 1999, Federal Parliament passed the first of a series of laws that put Australia on the road to tax reform. The first major element of the tax reform program is the introduction of a GST. However, GST is only one component of the new tax system. Other elements include a comprehensive review of business taxation, changes to the employee payment system and changes to personal income tax rates, to name just a few.

Each element of the tax reform package will require some change for your business - changes to record keeping, changes to tax and business reporting, and even changes to everyday business practices. Businesses will need to prepare and plan for the changes, identifying risks and opportunities along the way.

1.2 TAX REFORM AND BUSINESS

The key areas of the proposed tax reform package which

affect businesses, other than GST, include:

- * a reduction in the company income tax rate from 36% to 30%
- * the removal of provisional tax
- * the introduction of the Pay As You Go (PAYG) system of tax collection.
- * several changes to Fringe Benefits Tax (FBT), including:
 - * private companies and trusts previously exempt from paying FBT on benefits of more than \$1,000 (which are given to shareholders and beneficiaries), will be subject to FBT from the 1 April 2000.
 - * the value of fringe benefits will be included on group certificates from 1 April 1999.
 - * a reduction in the cost of diesel and other fuels for businesses, (particularly road transport)
 - * changes to the dividend franking system (BF1) and the way that dividends are taxed.
 - * an extension of the existing capital gains tax exemptions for business.
 - * the introduction of a Wine Equalisation Tax.

2.1 WHAT IS GST?

The GST is a broad-based consumption tax. Being broad-based, the GST is charged on goods, as well as services. Very few things are not subject to GST. Being a consumption tax, the final burden of GST lies with the end consumers - you and I.

- In basic terms, GST is charged...
- ... only by registered businesses
 - ... at 10%
 - ... on supplies (including sales, hires, leases, rents, etc)
 - ... of most goods and services

The majority of Australian businesses will need to get registered for GST.

Private individuals and businesses who are not GST-registered cannot charge GST.

The GST is designed to be a simple tax for business - simple to collect, simple to pay and simple to administer. Although GST is collected by businesses at each stage of the supply chain, the system means that GST is cost-neutral for most organisations, although there will be significant impacts on cashflow.

In most cases, the GST involves 3 basic rules for any registered business:

- 1) GST is charged at 10% to all customers
- 2) 10% GST is paid to suppliers who are also GST registered
- 3) the net amount (GST charged - GST paid) is sent to (or refunded by) the Tax Office with regular GST returns

Effectively, GST paid to suppliers is claimed back from the Tax Office. In other words, GST does not 'stick' to registered businesses.

The important thing to remember is that, at the

end of the day, most registered businesses will buy goods and services free of GST.

The exception to the rule is that registered businesses do not charge GST on 2 categories of transactions - GST-free supplies and input-taxed supplies.

Example 0.1

A GST-registered business buys goods from its suppliers for \$1,000 + \$100 GST. During the same month, the business provides services to its customers for total fees of \$3,300 (including \$300 GST). If there were no other transactions during the period, the business would send the net amount of \$200 (GST charged to customers of \$300 minus GST paid to suppliers of \$100) to the Tax Office with its next GST return.

2.2 EXCEPTIONS TO THE RULE

GST does not apply to

... As always, there are exceptions to the rule. There are 2 types of supplies on which GST will not be charged and there are important differences between them.

- These are called:
- * GST-free supplies
 - * Input-taxed supplies
- There is no such thing as a business that is GST-free or input-taxed. Every transaction must be looked at separately to decide how it is classified for GST. A single business could make a combination of normal taxable supplies, GST-free supplies and input-taxed supplies.

2.2.1 GST-FREE SUPPLIES

A GST-free supply is precisely that - a supply on which no GST is charged to customers. A business that makes GST-free supplies can still claim credits for the GST paid to suppliers.

GST-free supplies cover a wide range of goods and services. Some examples include:

- * Basic food
- * Most health and medical services, including hospital care and health insurance, medical appliances and aids
- * Primary, secondary and tertiary education, as well as professional and trade courses
- * Various types of child care services
- * Water and sewerage services
- * Exports of goods, as well as services provided outside Australia
- * Religious and charitable activities

2.3 DOES GST HAVE TO BE CHARGED?

As a general proposition, the majority of supplies made by registered businesses will be subject to GST.

GST applies to supplies. The GST law uses the term 'supplies', instead of 'sales'.

This is because the GST applies to more than just sales. It is designed to catch virtually any type of transaction where goods or services are supplied to someone else.

For GST purposes, a supply includes:

- * a sale, rent, hire or lease of goods;
 - * the provision of advice or information;
 - * a grant, assignment or surrender of real property;
 - * the creation, granting, transfer, assignment or surrender of any right;
 - * the entry into, or release from an obligation to act or to refrain from acting, or to tolerate an act or situation, or
 - * any combination of the above.
- Even if a supply is illegal, it is considered a supply for GST purposes. It is clear that there is very little that is not caught by the GST net.

2.4 WHEN SHOULD THE GST BE PAID TO THE TAX OFFICE?

At the time of supply. Whenever a registered business makes a supply of goods and services that is subject to GST, the business needs to know when to send that GST to the Tax Office.

At the end of every GST period (either monthly or quarterly), a GST return (known as the Business Activity Statement) must be lodged with the Tax Office, together with a payment or a refund claim for the GST net amount. This process is covered in more depth in Section 7.

When the GST charged to customers is included in a GST return depends on:

- * how the business has chosen to account for GST; and
- * how the time of supply rules apply to the transaction

There are 2 methods available to account for GST - the cash basis and the accruals basis. Every business must decide which method to use when they register for GST. This decision should be discussed with your accountant or business adviser.

2.4.1 THE CASH BASIS

Under the cash basis, the time of supply rules say that the GST charged to customers is included in the GST when payment is received. A business in this position will always receive the GST from customers before it is paid to the Tax Office.

If a customer only pays a deposit or part payment, GST on the amount received is included in the GST return.

2.4.2 THE ACCRUALS BASIS

Under the accruals basis, the time of supply is the earlier of:

- * the date that an invoice is issued for the supply; and
- * the date that full or part payment for the supply is received.

2.4.3 SPECIAL TRANSITIONAL RULES

There are special rules that apply to transactions occurring around the transition to GST on 1 July 2000. The rules define whether the transaction is dealt with under the sales tax system, or under the GST system.

2.5 WHAT PAPER WORK MUST SUPPORT THE TRANSACTION?

When a registered business supplies goods and services to another registered business, the supplier must provide a tax invoice for any transaction over \$50. A tax invoice is not required for transactions under \$50.

In most cases, there is no need to issue a tax invoice separately from the normal commercial invoice. In practice, businesses will use just one document and make sure that it contains all of the information that is required by the Tax Office for a tax invoice to be valid.

When a registered business supplies goods and services to end consumers, or unregistered businesses, there is no need to provide a tax invoice, unless the customer specifically requests that one be issued.

PAPERWORK, RETURNS AND ADMINISTRATION

The GST is built around getting the paperwork right

3.1 DOCUMENTS SUPPORTING TRANSACTIONS

3.1.1 TAX INVOICES

Tax invoices are the key to the substantiation rules.

Tax invoices are the key to the GST system.

No registered business can claim credits for the GST paid to their suppliers unless they hold a valid tax invoice to substantiate the transaction. In many ways, tax invoices are as important as cheques, because they entitle a registered business to receive a GST credit from blah blah blah blah blah blah blah blah blah blah blah blah blah etc.

¹ Prices in effect until June 30, 2000 or while stocks last. Savings based on RRP. Prices are recommended prices only. Prices from resellers may vary. Conditions Apply. Compaq is a registered trademark of Compaq Computer Corporation. Intel, the Intel Inside logo and Pentium are registered trademarks and Celeron is a trademark of Intel Corporation. All product and company names are for identification purposes only and may be trademarks and/or registered trademarks of their respective companies. Photographs are for illustrative purposes only and may vary from products depicted. All specifications are subject to change without notice. Information correct at 31/03/00

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Eg: Was: \$6995 Now: \$5946*

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PowWow 4.0

Tribal Voice's PowWow 4.0 (APC looked at beta 1) has earned a reputation as a fun way to meet people and claims to be one of the easiest to use. The simple and uncluttered interface certainly makes it a good service for novices.

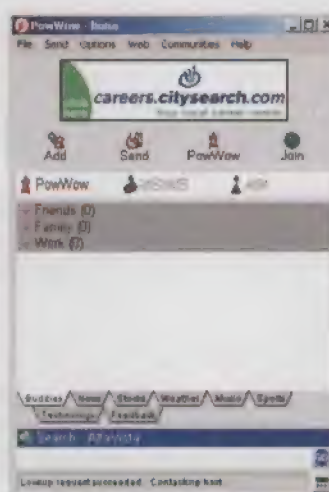
In practice, however, problems were encountered when attempting to use some of the more basic features of the program. On first attempt, the service failed to recognise that a buddy was online when he clearly was. Without success at such a basic level, you face a pretty one-sided conversation. Fortunately for PowWow users, help is not far away. A New User chat community is automatically loaded into the address book, and PowWow experts are always there to answer queries and offer suggestions. In APC's case, a guide suggested that a faulty buddy server was the source of the problem and subsequently advised us to try again later.

Although the service also boasts interoperability with AIM and MSN Messenger, AOL has severed its end of the connection. Therefore, if you attempt to use this option to chat with friends signed on with AIM, it simply won't work. On the plus side, chat-

ting with MSN Messenger users was a resounding success. Bear in mind that you must have an established instant messaging account with MSN in order for this option to work.

PowWow provides links to its various online communities, in which users can meet like-minded chatters. They are grouped by topics, age groups or lifestyles on the PowWow online guide. Once you gain access to a community, the online members are temporarily added to your buddy list, and disappear upon exit. There is also an option for users to create and host their own chat community, which gives you the ability to screen for offensive language and deny access privileges.

Extra messaging features include the Personal Communicator option, which truly makes messaging real time: charac-



ters pop up onscreen as your buddy types them in. There is also a whiteboard function for impromptu meetings, and you can transfer files between users.

In terms of security, you can specify who can contact you and what information they see. There is also a 'blocking book' to prevent particular people from contacting you; this works in much the same way as AIM's system.

PowWow does not respond directly to proxy servers and there may be

problems using the service behind a firewall; you need to consult your network administrator about opening the necessary ports on the server.

Contact	Tribal Voice
Online	http://tribal.com/
Price	Free
In short	The best instant messaging tool currently available.

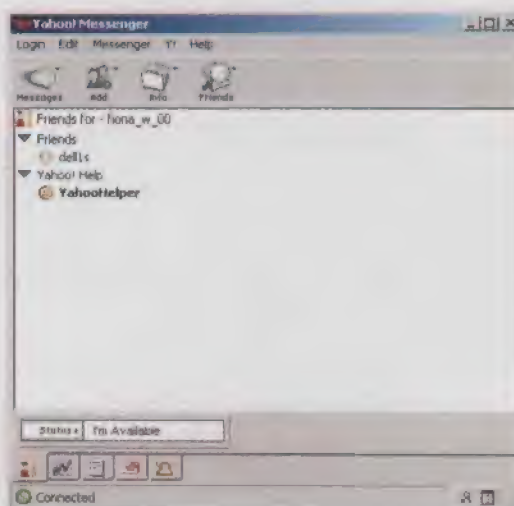
Yahoo Messenger

This is the instant messaging service for the Netizen who has everything. And if they don't, they can buy it from Yahoo. At least, that seems to be the logic behind the way the service is set up. Although it has a wide array of messaging functions, the one-stop-shopping element is a little hard to take. From obtaining stock quotes to bidding at auctions, Yahoo Messenger is a walking advertisement for the Internet portal from which it is derived.

Shameless cross promotion aside, Yahoo Messenger has quite good messaging features. People can share files, participate in online conferences and send invitations for contacts to send a voice message.

For personal security, users can choose to ignore messages from wannabe buddies, and can choose not to make their IP address publicly available. In this respect, it is not as comprehensive as AOL or MSN but would still be adequate for most people.

For business use, Yahoo Messenger can operate behind a firewall or proxy server. The file sharing and conferencing functions would certainly be useful, but the program's security may not be considered sufficient.



You need to obtain a Yahoo ID, which is free, in order to download the service. This can then be used to sign up for Yahoo's other services (no surprises there). What is surprising is that you do not need a Yahoo email account to use the program, nor can you access the email account from the messaging interface.

An informative online guide offers support in setting up the Messenger service and in providing tips to effective messaging, but does not allow the user to search for keywords. A contact who goes by the name of Yahoohelper is on hand to assist with any pressing queries. Send them a message and they'll give you instant advice and assistance.

Contact	Yahoo
Online	http://www.messenger.yahoo.com/
Price	Free
In short	A blatant Yahoo propaganda tool.

The Napster files

Napster is known as *the* place to search for MP3s. Although the exchange of MP3s is in many cases illegal (or perhaps because of it), the maverick program has developed a strong following among die-hard music fans.

For those not familiar with Napster, it allows music lovers the opportunity to share specific directories containing MP3s; they can pick and choose the files they wish to download and call their own. Napster draws the directory information from logged-on users and stores it in a central database. You can search the database to find the particular song you are looking for. You can then use Napster to copy the file from its current location to your hard disk.

There is a very strong sense of community behind Napster and people who share similar tastes in music are likely to make great chat partners. After all, you can tell a lot about someone from their taste in music. That's probably why Napster also functions as an online chat community, allowing fans the opportunity to chat about the relative merits of anything from Russian folk music to reggae. Not only can you swap transfer details with others while you wait for your download to finish, you can also use the chat room environment to find out about any gems you just can't seem to lay your hands on.



Although it's not purely an instant messaging service, there is a function for sending private messages away from the prying eyes of others. It doesn't have nearly as many features as the other instant messaging services, but it is a good way to make contact with people who share your taste in music.

The program invites others to peruse your directories for the files they seek. Therefore it's a little more lax about security than straight instant messaging services. However, if you don't fancy the prospect of allowing others the opportunity to fossick for MP3 files on your hard drive, you can simply choose not to provide any information about your directories. This way, you can search the directories of others but choose not to return the favour.

Napster can be downloaded from <http://www.napster.com/> and is available on this month's cover CD.

Editor's Choice



PowWow 4.0

Highly commended
ICQ 99b beta

A range of features and a strong emphasis on security sets PowWow apart from other instant messaging services. It allows chatters the freedom to share files and create online chat communities, in addition to instant messaging. It also scores brownie points for its compatibility with MSN Messenger, which gives its users more flexibility when building their buddy lists.

ICQ comes a close second; it provides a secure chat environment, has many features and runs on many platforms. It clearly deserves its large following.

On this month's cover CD

If hunting down and downloading your own instant messaging software isn't 'instant' enough for you, help is at hand. You can find a great selection of freeware and shareware instant messaging programs on disc 2 of this month's cover CD pack.

When there's more room on your hard drives than your Desk.



As the number of PC's you use increases, so does the hardware on your desk. Two machines. Two keyboards, two monitors, two mice. Three machines. Three keyboards, three monitors, three mice. Four machines? Another desk ...

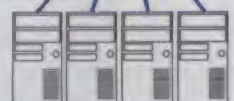
Now there's a powerful, compact, cost effective solution - the **Cybox SwitchView**. A Cybox KVM solution allows you to control up to 3048* PC's using just one keyboard, monitor and mouse. With a simple keyboard command (or push of a button), you can switch straight to the machine you want to work on. And you're not just saving space. Fewer peripherals mean you can look forward to savings on hardware and running costs.

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20TH BIRTHDAY SPECIAL REPORT

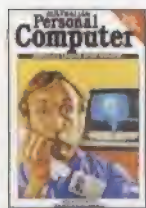
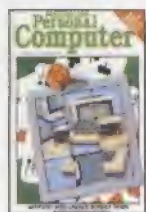
Australian Personal Computer

*Technology's past,
present and future*

When Sean Howard began publishing a small black and white magazine from his parents' house in 1980, he had no idea that he was founding Australia's most successful and longest running computing magazine. Over the past 20 years, *Australian Personal Computer* has fearlessly (if not always flawlessly) tracked the major trends in PCs, from uncertainty to uniformity and back again. In that time, technology has shifted from geek obsession to a dominant global industry, remorselessly changing every aspect of our lives. What worked? What didn't? And what's up next?

Two digital decades:

The world's first personal computer was difficult to put together, worked intermittently, was infuriatingly hard to use, required infinite patience and produced results that were not much use to anyone. Even so, everyone wanted one. Since then, things have only gotten worse.



The Altair 8800 was invented by Ed Roberts in 1974. Roberts' company, MITS, sold the Altair in build-it-yourself kit form. It had a series of switches and lights, and was programmed by flipping the switches to represent 8-bit binary numbers. Within months of the Altair appearing in an electronics magazine in January 1975, MITS was taking 25 orders a day. With persistence and ingenuity, the world's first personal computer programmers made the Altair do things it was never designed to do. A couple of programmers named Bill Gates and Paul Allen wrote a Basic interpreter for the Altair, and enthusiasts were soon adding keyboards, monitors and tapes to store and load programs.

And so the PC revolution began.

By the time medical student Sean Howard started *Australian Personal Computer* in May 1980, the industry had progressed a long way. Apple was the dominant force in personal computing, and the first killer app, the VisiCalc spreadsheet, was six months old. Companies such as Commodore and Radio Shack (Tandy in Australia) were also selling personal com-

puters. Home computers mostly used the 6502 processor and a Basic interpreter. Beefier business systems used Zilog's Z80 processor and ran Digital Research's CP/M operating system.

By 1980, rumours were already circulating that IBM was going to enter the personal computer market. At the time 'IBM' was almost synonymous with 'computer', so IBM's entry into the market was anticipated and feared. The IBM PC was launched late in 1981, using Intel's 16-bit 8086 processor and an operating system called PC-DOS, which was licensed from Microsoft. Although Apple was popular with business, home and educational users, IBM targeted its first personal computer strictly at businesses. The IBM PC's killer app was another spreadsheet called Lotus 1-2-3.

In order to get the IBM PC to market in the shortest possible time, IBM chose to use components that could be bought off the shelf. Only the BIOS chip was custom-built by IBM. It wasn't too difficult for startups like Compaq to reverse engineer that chip, buy the other components and make their own 'IBM-compatible' PCs. Understandably, IBM was not impressed, but even lawsuits failed to prevent the compatible market from flourishing. IBM was also less than impressed with Microsoft, which offered DOS to compatible manufacturers at very competitive rates.

By 1982, home computers such as Commodore's Vic 20 and the Atari 400 were still using the 8-bit 6502 processor. The IBM PC was gaining popularity with businesses, but it was by no means standard; many businesses were using Z80-based computers running CP/M because it had a considerable library of software as well as multiple-user and file-sharing features, much like a mainframe.

On a visit to Xerox's Palo Alto Research Center (PARC), Apple co-founder Steve Jobs spotted Xerox's Alto PC, which had a graphical user interface, a mouse and a network connection. Xerox never turned these concepts into a commercially successful product, but Jobs did — eventually. Apple's first attempt, the Lisa, was released in 1983. Although it was technically brilliant, the \$12,000 price tag put off all but the most enthusiastic Apple fans.

January February March April May June July August September October November December

80 81

- Motorola releases M68000 processor
- Sinclair releases ZX80
- Commodore releases Vic 20
- IBM releases PC
- Microsoft releases PC-DOS for the IBM PC
- Tandy releases TRS-80 Color Computer



Sinclair ZX80



IBM PC: desks were ugly in the '80s as well

Buzzword: artificial intelligence

Stats: TRS-80 home PC 16K RAM costs \$849 (\$1,980 in current dollar values). Vic 20 costs \$399 (\$930)

From 1 MHz to 1 GHz

In 1983, IBM followed up the PC with the more expandable XT. It sold in Australia for about \$8,000, mostly due to an expensive 10M hard disk drive. IBM's next release, the PCjr, was expected to corner up to 20% of the home computer market, but failed dismally because of poor design and usability.

Meanwhile, office workers were discovering that the real power of IBM and compatible PCs lay in connecting them together. This realisation made the fortunes of companies like Novell and 3Com. Novell's NetWare networking software rapidly became the standard, and remained so until the mid-'90s. 3Com was started by Ethernet inventor Bob Metcalfe to sell networking hardware. Ethernet also rapidly became a standard. Meanwhile, a group of graduate students from Stanford University and the University of California, Berkeley, formed a company called Sun, which sold a new type of computer called a workstation, which had both processing power and network connectivity. Sun's workstations used a derivative of BSD Unix, which Bill Joy had helped write while at Berkeley.

Undeterred by the Lisa's failure, Apple tried again. It launched the Macintosh with a spectacular television commercial screened during the NFL Super Bowl, using the slogan "Why 1984 won't be like 1984". Its graphical interface and pull-down menus made computing seem more accessible to non-technical users. The Mac's ease of use was envied by the IBM-compatible makers, and imitations soon followed, including Digital Research's GEM, Microsoft's Windows and IBM's Top View.

The Mac's killer app came in 1985 when Apple released its LaserWriter laser printer, which could connect to up to 32 Macintoshes using the AppleTalk network. Aldus Software then released PageMaker and desktop publishing was born, giving the Mac an unshakable hold on the publishing industry.

1984 was a year of big ideas. William Gibson's landmark novel *Neuromancer* coined the term 'cyberspace', when the closest equivalent in the real world, ARPANet, was still just a network of about 500 Unix systems in universities and military bases around the

US. Richard Stallman, a programmer at MIT (Massachusetts Institute of Technology), founded the GNU project to develop an operating system that was free of copyright or proprietary content and could be distributed to and modified by anyone.

By this time, the software industry was dominated by a few key players which were mostly interested in big, expensive, mass market products. Many users wanted smaller, more customised and cheaper applications. At the 1986 West Coast Computer Faire, the concept of shareware — try before you buy — first came to prominence. Of course at this stage the Internet was not a viable method of distributing software, and a large mail-order shareware industry sprang up as a result.

Intel released its 32-bit 80386 processor in 1986, but the only operating system that could take advantage of its 32-bit power and protected memory features was Unix. The 80286 was still selling well, and in 1987 AMD started selling low-cost 286 clones. AMD retained this strategy of leaving the high end to Intel and filling in the lower end of the market up until 1999.

IBM's grip on the PC market was failing, and in 1987, in an attempt to regain dominance, it launched the PS/2 range of computers. These featured high-resolution colour graphics and a new, closed-standard peripheral bus called Micro Channel Architecture (MCA). Neither MCA nor the PS/2 were the successes IBM had hoped for, but IBM remained the world's largest PC vendor until 1993, when it was overtaken by Compaq.

Although there were additions to DOS that made multitasking (or 'concurrency' as it was called at the time) possible, they were fiddly at best. IBM and Microsoft had been collaborating for some time on a new operating system called OS/2, which was released early in



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82 83

- Apple releases Apple III.
- Sinclair releases Sinclair Spectrum
- Intel releases 80286 processor
- Compaq launches IBM-

compatible portable, Computer Devices Inc launches The Dot IBM compatible

■ IBM sues clone manufacturers for saying their systems are "IBM compatible". Clone manufacturers accuse IBM of modifying PC-DOS so that it won't run on compatibles. IBM says 'compatibles' are not really compatible and it's the fault of the hardware.

■ Microsoft releases MS-DOS 2.0, offers it to IBM compatible manufacturers at \$19 a copy in quantities of 5,000 or more.

- Sony launches 3½in floppy disk
- Stanford graduate students Vinod Khosla, Andy Bechtolsheim, Scott McNealy and Berkeley graduate student Bill Joy found Sun Microsystems
- ARPANet switches to TCP/IP
- Apple launches the Lisa
- IBM launches XT
- Novell starts selling PC networking software
- Commodore releases Commodore 64
- Philips launches CD player
- Apple releases IIe
- IBM releases PCjr
- Len Bosack and Sandy Lerner leave Stanford University and start Cisco Systems to sell the routers they invented



Commodore 64

Stats: 500 Internet hosts, IBM XT costs \$7,892 (\$15,051 in current dollar values), Commodore 64 costs \$699 (\$1,333)

Buzzword: networking



1988. Its front end was practically indistinguishable from Microsoft Windows, but its back end had a great deal more power and flexibility than DOS. Most analysts believed OS/2 would become the dominant operating system.

The world's first viruses were written many years before, but by 1988 the problem was quite serious, even though it wasn't until several years later that virus stories caught on in the general media. The first antivirus software was released and the strange, symbiotic relationship between virus developers and antivirus developers began, as did the urban myth that antivirus software developers also write viruses.

Microsoft continued to develop Windows while it was writing OS/2 for IBM, and in 1990 released Windows 3.0. It had multitasking and was able to exploit the advanced features of the 386 and the new 486, which OS/2 could not do at that stage. Within a year of its release, Microsoft had sold 4 million copies of Windows 3.0. After releasing OS/2 2.0 in 1992, Microsoft and IBM divorced in a messy public slanging match. By 1993, Microsoft had sold over 25 million copies of Windows and it was pre-installed on 60% of all computers sold, spurred on by massive support from software developers.

Meanwhile, at an underground nuclear research laboratory in Switzerland called CERN, an English scientist, Tim Berners-Lee, conceived of a vast online research library, where scientists could read each other's works. By the end of 1990, Berners-Lee had written the basic software for what he dubbed the World Wide Web.

Neither Windows nor OS/2 were quite what some computer users were looking for. The GNU project had developed many parts of its Unix-like operating system, but by 1991 the fundamental element — the kernel — was far from complete. A Finnish student by the name of Linus Torvalds decided he would write his own kernel. Torvalds called it Linux, and started passing copies around to his friends.

Multimedia was the buzz of the early '90s, thanks to new sound and video capabilities in Mac OS and Windows, and soundcards

Meanwhile, at an underground nuclear research laboratory in Switzerland ...

like Creative Labs' Sound Blaster. The first portable digital cameras were released in 1991.

Before the Internet made email ubiquitous, software companies competed viciously in the so-called groupware space. Groupware provided tools for collaborating with co-workers through email, sharing documents and workflow tools. Two dominant standards eventually emerged: Lotus Notes/Domino and Microsoft Exchange. At the same time, email drove the growth of the Internet, which exploded from 10,000 servers in 1987 to over 1 million in 1992.

In 1991, a company called GO released an operating system called PenPoint that included handwriting recognition. This was enthusiastically received by the media, and many believed pen computing was the way of the future. Microsoft quickly released a version of Windows that could use a pen controller. However, pen computers were not taken up by the market.

In 1992, Apple released the first of a series of personal digital assistants (PDAs) using an operating system called Newton, which also featured a pen and handwriting recognition. Due to high cost and poor handwriting recognition, Newton went the way of PenPoint and Pen Windows. Undeterred by previous failures, in 1996 US Robotics released the Pilot PDA, which unlike its pen predecessors was a resounding success, capturing 40% of the PDA market by 1998.

While PDAs were getting smaller and more powerful, servers were getting bigger and more powerful. In 1993, Intel released the Pentium processor, and a collaboration between Motorola, IBM and Apple produced the first PowerPC processor. That same year, Microsoft released Windows NT, an operating system for servers. At the time, Unix and Novell were by far the most popular server platforms. Intel was by no means the dominant processor manufacturer for servers. It faced stiff competition from RISC processors such as the MIPS R4000, the DEC Alpha and the PowerPC. Microsoft released NT for the Intel, MIPS, Alpha and PowerPC platforms. Windows NT was initially considered a joke by systems administrators, but by the end of the decade it had captured a significant share of the market.

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84 85

- Microsoft announces Windows graphical desktop for PCs
- Apple releases Macintosh; Microsoft predicts that 50% of its 1984 retail sales will be for Macintosh

- AAP launches MDS microwave news service
- IBM releases PC/AT
- Digital Research releases GEM graphical desktop for PCs
- Richard Stallman starts the GNU project
- William Gibson coins the term 'cyberspace' in his novel *Neuromancer*
- Telecom releases Computerphone
- Telecom launches Viatel videotex system. Computer Publications provides downloadable software on page #666

- Apple releases LaserWriter laser printer, Aldus releases PageMaker desktop publishing software

- Sony and Philips agree on CD-ROM standard
- Commodore launches Amiga
- Steve Jobs forced out of Apple, starts NeXT
- WordPerfect Corporation launches WordPerfect word processor



Apple Macintosh



Telecom ComputerPhone: still trying 15 years later

Buzzword: desktop publishing

Stats: Apple Macintosh costs \$3,250 (\$5,96 in current dollar values)

Although the Internet had undergone explosive growth, it was mostly the domain of arcane, text-based Unix systems. A group of students at the University of Illinois' National Center for Supercomputing Activities (NCSA) produced Mosaic, a graphical way of viewing World Wide Web content — first for Unix, but soon after for Windows and Macintosh. By the end of 1993, NCSA estimated that over a million people were using Mosaic. Mosaic's authors teamed up with Silicon Graphics founder Jim Clark and formed Mosaic Communications, later called Netscape Communications. Late in 1994, it released Netscape Navigator, choosing the then rather unorthodox approach of giving it away free for non-commercial use. By 1996, Netscape had distributed over 38 million copies, making it the most popular PC application of all time — at least for a while.

It is no coincidence that in 1994, the year following Mosaic's release, the number of Web servers grew from 500 to 10,000, and in 1995 that number grew to 100,000; the Web's first killer app had arrived. Mosaic/Netscape was what led people to the Web — Netscape also made a spectacular debut on the stock market in 1995 — but others soon found innovative ways to use the new medium. Stanford University students David Filo and Jerry Yang started making a catalogue of the Web in 1994, which they named 'Yahoo!'. By 1996, Yahoo — floated on Nasdaq — was the most popular search service on the Web. In 1995, Seattle entrepreneur Jeff Bezos started selling books online through Amazon.com, which filed its IPO in March 1997.

In 1995, Sun released Java, a programming language which allowed applications to be transmitted over networks, then compiled and run on just about any system. Its release set in motion an explosion of interactivity on the Web. RealAudio released its technology to compress audio files so they could be streamed over the Web and played back in real time. Macromedia used Java as the basis for Shockwave, a language that allowed animated and interactive content to be viewed over the Web.

Microsoft was slow off the mark in noticing the potential of the Internet, but soon after the release of Windows 95 in 1995, it set out to dominate. Windows 95 was something of a paradigm shift, focusing more on documents than on applications as Mac OS had always done. At the same time, Microsoft also launched the Microsoft Network (MSN), a proprietary online service it positioned as an alternative to the Internet, and Internet Explorer, an Internet browser to rival the immensely popular Netscape Navigator. Ironically, Internet Explorer was not a success until Microsoft did

an about-face on MSN and started offering it as an Internet gateway.

Later in 1995, Microsoft and Netscape both released version 2.0 of their browsers. Netscape's included Java and an email client, while Microsoft's included some non-standard additions to the HTML. People were concerned that the Internet would be split into Windows users and everyone else, but in the end, Microsoft's additions were included in the HTML specification. The same story played out again in 1996 when Microsoft added ActiveX technology — an alternative to Java that only ran on Windows — and again in 1997 when the Java virtual machine in Internet Explorer 4.0 included Windows-only functions. These attempts at global domination were thwarted; ActiveX never gained the popularity of Java, and a lawsuit forced Microsoft to include a Java virtual machine that was compliant with Sun's specifications.

PointCast launched its 'push technology' news service in 1996, which would automatically send out selected news headlines to each user's computer. Both Netscape and Microsoft's 4.0 browsers included their own version of push technology: Netscape's Netcaster and Microsoft's Channels. However, poor software and a distinct lack of advantages over a much more common form of push technology — email — meant that push never became the 'next big thing' it was expected to be.

Ever since IBM released the XT, a hard disk drive had been considered an important component of a desktop computer, although it was still possible to buy a PC without one in the late '80s. But in 1996, a group of companies spearheaded by Oracle, including Sun, Netscape, IBM and Apple released a set of guidelines for the network computer or NC: a computer connected to a network, which ran Java natively and had no internal storage. This alliance was strong enough to sufficiently worry Microsoft and Intel; the two companies released their own specification called the NetPC. Sun released an NC



86

87

- Apple sues Digital Research over 'look and feel' of GEM
- Shareware concept appears for first time at West Coast Computer Faire

- Software clones such as SoftKlone Distributing Corporation's Mirror (clone of Crosstalk) and Paperback Software's VP-Planner (Lotus 1-2-3 imitator) are released
- Intel releases 80386 32-bit processor. Manufacturing problems lead to short supply by middle of 1987
- Apple releases IIGs, Macintosh II and Macintosh SE, ships one millionth Macintosh

Commodore
Amiga A500

- IBM releases PS/2 range of PCs
- IMS releases the T800 Transputer, using Inmos' Transputer chip, designed to be implemented in multiprocessor configurations
- AMD announces 80286-16, a 16MHz 286 processor
- Hypertext programs — most notably Apple's HyperCard — start appearing, but are seen as a database tool



IBM PS/2



called the JavaStation in 1997, and Corel developed a version of Corel Office for Java, but the idea fizzled because users were unwilling to part with their local hard disk drive.

Microsoft and Intel's domination of their respective markets attracted the attention of the US Government in 1997. The Federal Trade Commission (FTC) launched an investigation into possibly monopolistic practices by Intel, while the Department of Justice (DOJ) sued Microsoft over its licensing practices for Windows 95. The DOJ suit was later extended to include the integration of Internet Explorer 4.0 into Windows 98. The FTC's case against Intel drew a blank, but the DOJ eventually concluded that Microsoft had abused its monopoly power, although the only real remedy — a competing mainstream desktop OS — still hasn't surfaced.

In its defence, Microsoft claimed Linux was a threat to its desktop OS market. The operating system Linus Torvalds wrote as a hobby in 1991 had grown enormously. Because Torvalds allowed free distribution of the source code, developers all over the world were able to make their own tweaks and changes. Companies such as Red Hat and Caldera started selling pre-packaged distributions of Linux, and others such as Linux-Care prospered by selling support services.

The success of Linux made other software developers take notice of the advantages of free distribution of their software source code. Netscape released the source code of Communicator 5.0 (nicknamed Mozilla) in

1998. This prompted the start of the open source movement, which advocated the benefits of releasing source code to the community, as Richard Stallman's Free Software Foundation had been doing for over a decade. Major developers such as Sun, Apple and Inprise embraced open source to varying degrees.

Attracted by the immense success of the early Internet IPOs, Internet-related businesses flocked to the stock markets and Internet stocks continued to be valued at very large multiples of their

earnings. Pundits continually predicted that the bubble would burst, but few were willing to say when; those who have given dates have been wrong — so far.

Apple floundered during the mid-'90s, but in 1997 it invited co-founder Steve Jobs back, initially as an advisor and by the end of the year as interim CEO. Under Jobs' guiding hand, Apple released the iMac in 1998, a controversial computer whose external design was promoted a great deal more than its technical specifications. The iMac was a turning point in Apple's fortunes, and although Apple may never regain the dominance it had after the release of the original Macintosh, it is again a major force in personal computing.

By the late '90s, Intel had a seemingly invincible position in the desktop and small to medium-size server markets, but several manufacturers shared the desktop and portable space. Following the release of Intel's aggressively priced Celeron processor in 1998, the lower end of the market became unprofitable and by 1999, a financially crippled AMD was its only real remaining competitor. However, AMD had one last trick up its sleeve: an entirely new processor design which it released in 1999 under the name Athlon. Since the release of Athlon, a performance war between AMD and Intel has significantly accelerated the pace of development in processors.

The success of Amazon.com was merely the beginning of an explosion of commerce on the Internet. The first ecommerce companies were small startups, but large well-known businesses also started to sell their products online, although very few online retailers have made significant profits yet. Ecommerce expanded to include business-to-business (eg. businesses using the Internet to deal with their customers and suppliers) and consumer-to-consumer (eg. auction sites such as eBay).

As recent history merges into current events, it becomes more difficult to summarise events accurately. The current trend towards non-PC Internet access devices such as mobile phones, PDAs, set-top boxes and game consoles could be the next big thing everyone is predicting, or it could be the next push technology — a good idea that failed to live up to the hype. Application service provision (ASP) may prove a revolution in the way we deal with software, or it may encounter the same resistance as NCs and never take off. Linux could one day put a serious dent in Microsoft's market share, or it may go the way of OS/2 — a superior technology that lost the marketing war. Only one thing seems certain: the future won't be what we expect. ■

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88 89

- IBM and Microsoft release OS/2
- UK software developer Sophos releases Vaccine antivirus software
- Sun releases 4/110 workstation based on the SPARC processor
- NeXT launches NeXT Workstation, NextStep operating system
- Intel announces 80486 processor. Shipping is delayed by several months due to a bug in the chip
- Motorola announces 68040 processor



- CERN scientist Tim Berners-Lee proposes a networked hypertext information system
- Lotus releases Notes groupware application
- Apple releases Macintosh Portable
- Atlantis International releases PC/TV



Macintosh Portable: Apple has since hired a new designer

Sun 4/110 workstation

Buzzword: workstation

Howard's way

APC's founding editor Sean Howard reminisces about the early days of the magazine.

What's your most distinct memory of putting together the first issue of APC?

It was a lot harder than I expected. My most distinct memory of the second edition was the fly that was squashed on a photographic plate and became part of the magazine.

Are there any articles that make you cringe with embarrassment?

Yeah, a lot of early issues, [when] I look back, were pretty badly produced. In terms of editorial, I remember one issue we predicted the end of programmers; it was a good article, but it turned out to be wrong.

Isn't that part of the job — to be wrong?

Absolutely — a lot of what we predicted was wrong. We did a lot of articles about neural networks, and while neural networks are very interesting and have their place, they have not become commonplace, especially in home and business use.

APC was one of the pioneers of online publishing with its teletext pages. Why didn't teletext take off?

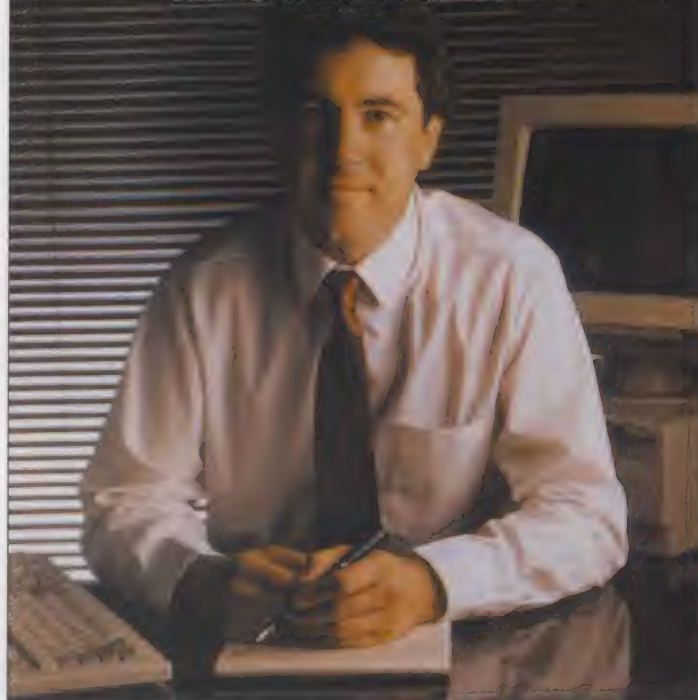
It was a lot slower than what is available now over the Internet and very expensive, so it only ever attracted a small proportion of the public, but it was an important step in the direction of electronic publishing. I always felt that magazines about the computer industry would be the first to be affected by, and move into, electronic publishing, because their customers had a huge head start over the rest of the population in terms of owning the computers and modems to access it.

Why did APC have a chess column for so many years?

Simply because chess was one of the most popular applications of the time. It seems odd now, but when you talked to people about the specific reasons for buying a computer, once you got past the nebulous responses like wanting to experiment with programming or playing games, chess was one of the most common reasons.

"I am delighted to announce Australia's first electronic magazine network — APC MAGNET."

— Sean Howard, editor
Australian Personal Computer



Sean's 1990 plug for one of APC's early online ventures

So it was playing the game, not programming it?

Yes, I was always disappointed by the lack of response to programming articles. We persistently ran them but the readership's interest in programming didn't warrant the number of articles we ran, and that always disappointed me. I found it a fascinating topic, and far more interesting than another review of the latest blindingly fast 286 IBM clone.

January February March April May June July August September October November December

90 91

- Microsoft releases Windows 3.0, MS-DOS 5.0
- Lotus founder Mitch Kapor (among others) starts the

Electronic Frontiers Foundation

- Tim Berners-Lee writes the first World Wide Web software
- Citrix releases Multiuser, software which allows users to run OS/2 applications on terminals
- Creative Labs releases Sound Blaster soundcard
- GO releases PenPoint operating system for pen-based computers.
- Microsoft releases PenWindows for pen-based computing



Windows 3.0

- NCR releases System 3125: a pen-based computer that runs PenPoint and Windows for Pens
- AMD releases Am386 and Am386DXL, 80386-compatible processors

- Intel releases 486SX processor
- Linus Torvalds develops prototype Linux kernel



NCR System 3125: the pen was not mightier than . . . anything

Buzzword: pen computing

Stats: Sound Blasters cost \$280 (\$320 in current dollar values)

Geeks through the ages

From social outcast to millionaire and back again, APC traces the changing face of the technology junkie.

1983



1987



What technology they're using

What they want to use

What they spend their time doing

Their email address

What gets on their nerves

Favourite technology-related movie

Their favourite game

Their personal theme song

Dick Smith VZ-200, cassette drive, spare TV

Apple Lisa

Typing in really bad Basic programs that don't work from the back of the magazine

Email? What's email?

Typing in really bad Basic programs that don't work from the back of the magazine

Tron (Bruce Boxleitner was really going places)

Lemonade Stand

'Pac Man Fever' by Buckner & Garcia

PS/2 Model 30, dual 3.5in floppy drive, DOS

A hard drive

Waiting for the guy who wrote their accounting package to call them back
CompuServe: 666543,7890

CGA graphics; the high price of floppies

War Games (Ally Sheedy was really going places)

Leather Goddesses of Phobos

'Axel F' by Harold Faltermeyer

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92

■ Logitech releases Foto Man portable digital camera. Sprinter releases Dycam Model 1 digital camera

■ PCMCIA standard is proposed

■ Intel announces 486DX2 processor

■ Microsoft releases Windows 3.1

■ IBM releases OS/2 2.0



Apple Newton

■ Cyrix releases 486SLC; first 486 clone processor

■ Apple releases Newton PDA

■ IBM and Microsoft officially split on OS/2

■ Microsoft releases Windows for Workgroups



Windows 3.1

OS/2 2.0

Buzzword: multimedia

Stats: CD-R drive costs \$12,000 (\$13,500 in current dollar values), blank CD costs \$50 (\$56)

1991



Osborne 386/25, 20M hard drive
Windows 3.0
A CD-ROM drive
Playing Solitaire

smithj556@arial.ucl.unimelb.edu.au
Media beatups about the
computer virus threat
Terminator II (Linda Hamilton
was really going places)
The Secret Of Monkey Island
'Smells Like Teen Spirit' by Nirvana

1995



Compaq Pentium 90, Windows 95,
14.4Kbps modem
Java
Emailing their friends links to really cool
sites some guy in Arizona put together
hotguy@ozemail.com.au
Trying to run Windows 95
with 4M of memory
Hackers (Fisher Stevens was
really going places)
Doom II
'Closer' by Nine Inch Nails

2000



Dell Celeron 500, 128M memory,
Linux/Windows 2000 dual boot
Broadband
Trying to cope with their addiction to
eBay/ICQ/Linux patches
HOSPAMimithi@1356444444.com
People who won't trade
their entire MP3 collection
The Matrix (Keanu Reeves
should be worried)
EverQuest
'What's My Age Again?' by Blink 182

January February March April May June July August September October November December

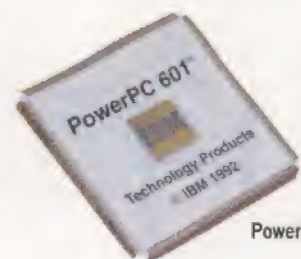
93

- NCSA writes Mosaic graphical WWW browser for X Window System
- Intel launches Pentium processor
- Motorola releases PowerPC 601 processor
- Microsoft launches Windows NT
- Digital Equipment Corporation releases the Alpha processor
- NCSA team releases Mosaic for Windows and Macintosh
- Peter de Jager writes *Doomsday 2000*, warning of the Y2K problem
- O'Reilly & Associates publishes Global Network Navigator online magazine, with advertising
- Number of WWW servers grows from 50 to 500

- Mosaic authors and Silicon Graphics founder Jim Clark start Mosaic Communications
- NCSA estimates over 1 million people are using Mosaic
- Compaq outsells IBM to become world's largest PC vendor



A DEC Alpha box, the archetypal early '90s tech lust object



PowerPC

Buzzword: information superhighway

Stats: 2 million Internet hosts

Shooting our mouths off

Things don't always work out the way we expect. Even though over the years APC's writers have had a great deal of experience and expertise, their predictions haven't always turned out to be right. Sometimes they were seduced by the technological beauty of an idea. A few were stubborn, like the columnist who remained a DOS fanatic well into the mid-'90s. Some were optimistic. And some were just plain wrong.

[The IBM PC] doesn't seem startlingly innovative or price competitive, but IBM's reliability and marketing and support expertise will keep the other personal computer manufacturers on their toes.

Miriam Cosic, August 1981

In a few years time, and almost certainly by the end of this decade, it is reckoned that the majority of data storage in small systems will be photographic rather than magnetic.

Martin Banks, January 1983

We will see the infiltration of AI technology into every place the computer goes. The 1990s will see the walls between intelligent applications and conventional applications crumble.

Daniel Rasmus, February 1991

Like it or lump it, the Robot Age has arrived.

Graham Storr, March 1986

The disk is dead, and the only question is: when do we bury it?

Guy Kewney, June 1987

We have all become so used to the idea that competent speech recognition and synthesis systems are the stuff of science fiction . . . that it comes as something of a surprise to discover just how much they belong to the here and now.

Martin Banks, December 1984

For a start, the era of venture capitalists in microcomputer products is probably over.

Chris Rowley, January 1985

By the year 2000, neural network technology will account for half the total revenue of the robotics and computer markets.

Jane Morill Tazelaar, August 1989

If IBM continues to back MS-DOS as its primary operating system, and if that operating system is enhanced to gradually include a sophisticated degree of multitasking, then that'll be the end of Unix, at least as far as the PC world is concerned.

David Ferris, February 1985

In my opinion, it will be the electroluminescent display which eventually takes over from the CRT as the main computer display device.

Keith Brindley, April 1985

Research in the US suggests that by the mid-'90s, home banking will account for up to 70% of all banking transactions.

Anonymous, June 1985

After dominating the keyboard for 111 years, perhaps the reign of the QWERTY is drawing to a close.

Connall Boyle, June 1984

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94

■ Apple releases Power Mac range of PCs using the PowerPC 601 processor

■ Jerry Yang and David Filo start the Yahoo Online catalogue

■ Lawyers Laurence Canter and Martha Siegel post an advertising message to 6,000 newsgroups, eliciting outrage from the Internet community

■ Novell acquires WordPerfect Corp and buys Quattro Pro from Borland

■ Cyrix and IBM agree to collaborate on production of Cyrix-designed 486-compatible processors

■ Microsoft demos Windows 4.0 for the first time



Apple Power Mac

■ AMD announces K5 processor

■ Sun announces 64-bit UltraSPARC processor

■ Microsoft officially names Windows 4.0 'Windows 95', releases Windows NT 3.5

■ Netscape Communications (formerly Mosaic) releases Netscape browser for Windows, free for non-commercial use, \$US99 for commercial use

■ Dr Thomas Nicely discovers floating point calculation bug in the Pentium processor. Intel said it knew about the bug, but felt that it would only affect a very small number of users



PowerBook 540C

Buzzword: plug-and-play

Ignore all those IBM groupies who keep telling you about the Intel 80386 and the future of computing. Go and look at the Transputer.

Guy Kewney, April 1987

[Hypertext will] permit a new form of electronic publishing... Nothing will ever be misquoted or out of context... Royalties will be automatically paid by a user whenever he or she draws out a byte from a published document... with complete fairness to all parties.

Theodor Nelson, February 1988

The personal computer user will still live under the constant threat of a system crash, but the likelihood of that even occurring is receding rapidly. This is due to the greatly improved quality of components and manufacturing techniques.

Nick Hampshire, February 1988

The Macintosh will languish and die as competing PCs become more powerful, using bigger and faster microprocessors from Intel

Take a good, long look at the space around your desk... it may be the last workspace you ever set up outside your home.

Angus Kidman, February 1996

If DOS is dead, then it's the liveliest corpse I've ever seen.

John Dvorak, October 1994

This is one reason why I think Windows will reach only a small segment of the PC world — maybe a third of all users. I recently re-explored Windows and realised that it's incredibly inefficient when compared to the command line approach to computing.

John Dvorak, February 1991

It's hard to see how GEM will fail.

Peter Worlock, December 1984

Unix will never break out of its specialist mould and become the operating system for all systems, and even on servers its future is measured in years, not decades.

Jeremy Horey, December 1995

OS/2 will almost certainly be the final winner, but Windows looks like having a very healthy life cycle in the intervening years.

Ian Davies, September 1990

I tried very hard to get enthusiastic about Intel's 80486, which it is now talking about to customers. Perhaps I would have succeeded better if I hadn't been talking to a lot of designers of RISC architectures.

Guy Kewney, January 1988

Some things never change... like advertising



1980



1986



1993

95

- Microsoft launches Windows 95
- Sun releases Java and HotJava browser
- RealAudio releases its streaming audio technology
- Amazon.com starts selling books over the Internet

■ Microsoft launches MSN, a proprietary alternative to the Internet

■ IBM purchases Lotus for \$US3.5 billion

■ Microsoft's launch of Office 95 signals the dominance of office suites and the demise of individual office applications



Sony PlayStation

- Sony launches PlayStation game console
- Microsoft releases Internet Explorer 2.0
- Netscape releases Navigator 2.0
- Macromedia licenses Java from Sun to produce Shockwave
- Netscape and Sun release JavaScript
- 33.6Kbps modems released
- Intel releases Pentium Pro processor



Our vision in 1995 of what PCs would look like in 2000

Right about now

Of course, whether through luck, good guesswork or genuine prescience, APC's writers and famous industry figures occasionally get things right. Here are some of the more interesting predictions to have made the pages of APC in the last 20 years.

Menu-driven software will be extinct in another 10 years . . . We can look forward to seeing all the options hovering at the top of the screen. Dan Bricklin, March 1984

I can see an entirely new generation of PCs emerging which will have animated graphics capabilities . . . The only problem I foresee is that you'll need to hire a Hollywood movie director to write a game. Dick Pountain, October 1987

Despite all the hype about RISC, the reality, at least as far as the PCs that most of us actually use are concerned, is that the Intel 86 family will dominate the market throughout the 1990s. William Zachman, November 1989

We can expect media coverage of viruses to remain disproportionately large. Unfortunately, a corollary to this is that continued adulatory media coverage will inspire the next generation of vandalistic hackers with time on their hands to develop increasingly sophisticated viruses. Ian Robinson, May 1992

Australians should recognise the potential for innovative software and strive to establish an international reputation in this field. Sean Howard, May 1980

Email is one of the major technology applications that will make group computing popular in the future. Steve Jobs, July 1989

Ten megabytes on a single side of an 8in floppy disk are certainly going to make a name for Iomega Corporation. Anonymous, July 1981

With the introduction of Microsoft's Windows 3.0 in early 1990, which may possibly be bundled in with many PCs in the near future, the PC has the chance to add ease of use to its software style and threaten Apple's protected market niche. Tim Bajarin, November 1989

Broadband ISDN promises us an amorphous cloud into which our PCs can pump packetised data at staggering rates with guaranteed delivery to anywhere on the planet. But the promise is many years from fulfilment. Sean Howard, March 1992

Creosote's law — as relevant today as it was a decade ago — states that software expands to fill all available disk space. Creosote, of course, was the rather portly chap in Monty Python's *The Meaning of Life* who filled himself to capacity and beyond with explosive consequence. Ian Robinson, June 1992

There is no doubt that individual governments can and will make regulations concerning what can be transmitted electronically. While they may not be able to control the arrival of material from other countries, they will certainly be able to prosecute local content providers who breach content guidelines. The key question is what material they choose to deem as unacceptable, and how they propose to make that material unavailable. Angus Kidman, August 1996

January February March April May June July August September October November December

96

- Pixar and Disney release *Toy Story*, Steve Jobs' share in Pixar estimated to be worth \$US1.17 billion
- PointCast launches its 'push' news service
- US Congress attempts to regulate Internet content with Communications Decency Act, later ruled unconstitutional
- Netscape distributes 38 millionth copy of Netscape, becoming the most popular PC application ever
- Iomega releases Zip drive
- WebTV launches
- Microsoft and NBC collaborate on MSNBC online news service
- Former Apple employees Sabeer Bhatia and Jack Smith start Hotmail



Iomega Zip drive

- Oracle, Sun, Netscape, IBM and Apple release NC architecture guidelines
- Microsoft releases Windows NT 4.0
- US Robotics releases Pilot PDA, using Palm Computing's Graffiti handwriting recognition software
- Microsoft launches Windows CE OS for handheld computers
- Microsoft and Intel release NetPC specification, using Intel processors and Microsoft Windows
- Corel releases Office for Java



Pilot PDA

Buzzword: Java

Stats: US Robotics' Pilot cost \$499 (hey, it costs the same now!)

Some people have suggested that by the end of the decade we will all be walking around with mobile computers and that we will never have to connect them to a wire again. This is not correct.

Jeremy Horey, December 1993

People still copy software, and most of us who work for a living have little sympathy for the plight of the software vendor. After all, the software industry will eventually generate more millionaires than any other business in history. John Dvorak, June 1992

Email is no longer on the fringe; it will become an integral component, not only of the way you work, but the way you communicate with the rest of humanity. If you think that's an exaggeration, I dare you to clip this article and reread it in 10 years' time. Jeremy White, April 1993

In 1985 there were 25,000 Elvis impersonators. By 1995, there were so many that efforts to count the number of Elvis impersonators had been abandoned, and projections are that on current growth rates, by 2010 every third person will be an Elvis impersonator. Yes, there's something fundamentally wrong with trying to predict the future based on statistical tendencies and exponential growth rates. Helen Dancer, August 1998

Microsoft Bob, I believe, is not destined to become a commercial success... Its name is weird, its concept is peculiar and it borders on being a 'who-needs-it?' program. John Dvorak, July 1995

And what will APC be covering in its 40th year? Here's our prediction...

AFTERNOON EDITION
MAY 21, 2020

Australian Personal Computer

FREE BUCHER IN JEWEL CASE, JUST ADD ENVELOPE!

EARTH'S LEADING WEB APPLIANCE MAGAZINE 2000 BEENZ

CAN WINDOWS MAKE A COMEBACK?

WINDOWS 2019 PREVIEWED

IS THE BEIGE BOX DEAD? BLACK CASE PC TESTED

THE 2038 PROBLEM: ARE YOU READY?

TECHNOLOGY LOSERS DICTIONARY: FROM NC TO YAHOO

INTERACTIVE TV: 20 MILLION CHANNELS, NOTHING TO WATCH

MICROSOFT AOL TIME WARNER MCI GENERAL MOTORS SOLUTION 6 WORLD BANK:
THE MERGER EXPLAINED

BROADBAND: READY FOR PRIME TIME?

INTERNET STOCK CRASH LOOMS

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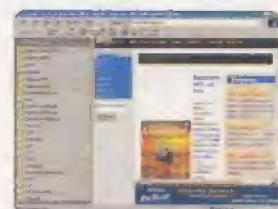
97

- Sun releases 'The Brick' JavaStation NC
- US Robotics releases x2 standard for 56K modems, Rockwell releases K56 Flex standard
- Intel releases Pentium with MMX processor, Pentium II processor

- The Y2K bug begins to attract attention in industry media
- AMD launches K6 with MMX processor, Cyrix releases M2 processor
- Microsoft releases Internet Explorer 4.0, Netscape releases Communicator 4.0
- Australian Government deregulates telecommunications sector



- Sun sues Microsoft over Java virtual machine in Internet Explorer 4.0
- US Federal Trade Commission begins investigation into Intel for monopolistic practices and restricting competition
- Apple buys Power Computing for \$US100 million, cancels clone program. Steve Jobs appointed interim CEO
- US Department of Justice sues Microsoft over anticompetitive licensing practices of Windows 95
- Microsoft releases beta of Windows NT 5.0
- Microsoft buys Hotmail for \$US400 million



Microsoft Internet Explorer 4.0

Sun JavaStation NC: where's the hard drive?

Buzzword: push technology

Ghosts of



Sean Howard, 1980 to 1988

I wish I'd been editing the magazine through to 1995, then I could have said the Internet. Still, it would have to be networking, the elimination of sneakernet, which was the way we used to transfer files around the office — someone would save the files on a floppy and then walk over to the other computer. However you want to look at it, communication between computing devices has been the great enabler of technology in the last 10 years, and it really began in the '80s with the wiring of intra-office networks.



Maryanne Phillips, 1992 to 1994

In 1994, computing and telecommunications came together. The idea that it was not enough for the 'box' to compute took hold. It had to be connected as well.

While the Internet marked a fundamental change in how we used computers, the radical shift towards new operating systems, such as Windows 95 and NT, and the development of new processors, such as the Pentium and PowerPC, made it all possible.

These components made way for hardware and software that would serve the needs of developers and provide people with the performance and tools required in the late '90s.



Cathie Kennedy, 1988 to 1992

"The future . . . will hold connectivity as the key to productivity," wrote then APC columnist Helen Dancer in April 1992.

It was a year when founding editor of APC Sean Howard launched OzEmail, a radical new outfit he dubbed an 'online communications service provider'. And we marvelled at the aggressive pricing of the new generation of laptop computers that were breaking the \$10,000 barrier.

During my time as editor, these two developments combined to signal the dawn of a new era: ubiquitous computing. The concept of access to information — anytime, anywhere — had just been born.

January February March April May June July August September October November December

98

- Netscape releases Communicator 5.0 source code, provides impetus for the open source movement
- V.90 standard unifies previously warring parties Rockwell and US Robotics over 56K modem standards

- Compaq buys Digital for \$US9.6 billion
- Intel releases Celeron processor, 'Mendocino' variant of Celeron with 128 on-chip cache, Pentium II Xeon processor
- AMD releases K6-2 processor
- USB connectors become standard on most new computers
- Couple announces plan to lose their



iMac

virginity live online, before being exposed as a hoax

- Apple releases iMac
- Windows 98 is released. An Australian is the first in the world to buy a copy
- Recording Industry Association of America sues Diamond over its Rio MP3 player
- AOL buys Netscape Communications for \$US4.2 billion
- US District Court orders Microsoft to modify its Java virtual machine to comply with Sun's specifications
- Bill Gates hit with cream pie by Belgian prankster Noel Godin



Bill gets creamed

Buzzword: portal

Stats: 3.6 million Web servers

editors past

APC gathers together its previous editors and asks 'What was the most important advance in technology during your time on the magazine?'.



Jeremy White, 1994 to 1998

By 1995, the Internet's presence was something most APC readers were starting to take for granted, but its potential to influence the general development of technology continued to astound us all.

Nowhere was this more apparent than in the rise of Linux, which presented Microsoft with a real challenge in the OS market and showed an alternative path for the development of all kinds of technologies. Linux threatened to change not just the computing systems we use, but also the social infrastructure that is used to create them. It was a new OS for a new era in which all conventional wisdom went out the window. Even if the Linux user base stopped growing today, its influence would continue to be felt for years.



Steven Fear, 1999 to 2000

For most people, the central appeal of technology is not what lies under the hood, but the ability to do something in an easier or cheaper way. Despite howls of protest from the music industry, MP3s became the dominant source of Net traffic as the decade drew to a close. MP3s might not have sounded quite as good as CDs, but at the price — a big fat zero — very few people were complaining.



Helen Dancer, 1998 to 1999

One of the most significant shifts during my time as editor revolved around the meaning, not of the word 'new', but the word 'free'.

The industry embraced the notion that customer eyeballs could in fact be a better revenue proposition than purchase price.

What began as the 'free PC' concept soon spread to free ISPs, which trade Internet access for demographic, sociographic and geographic information about you. To paraphrase Pete Townshend: Who are you? They *really* want to know.

January February March April May June July August September October November December

99 and beyond

iBook



- Following the release of iMac, USB peripherals proliferate
- Intel launches Pentium III processor
- Australian government passes a law to ban offensive and illegal material online

- Melissa virus spreads, prompting massive media coverage
- Apple releases (parts of) source code for OS X
- AMD launches K6-III processor, Athlon processor
- Judge Thomas Jackson finds against Microsoft in the long-running DOJ v. MS case
- Intel releases Pentium III Coppermine processor
- January 1, 2000 passes without a hitch, Y2K disaster fails to eventuate
- AOL and Time Warner merge to form \$US350 billion media superconglomerate
- AMD releases first 1GHz processor, beating Intel by two days



Mobile Internet almost took off

Buzzword: ecommerce

The last word



Sony's Aibo sold a lot better than this 1984 consumer robot, the Topo. We can't imagine why



"Well, we took a poll and found that what people really wanted wasn't more power or increased applications, but really groovy tail fins."



Not many people know that Apple stole its entire design philosophy from this 1990 APC cartoon

Bill Gates in 1988. Three billion, 4 billion, 5 billion ...



We have no rational explanation for this 1992 advertisement

Writer: Josh Mehlman Illustrators: Warren Taylor ('Geeks through the ages') David Morris ('Ghosts of editors past')

THE CLEVER COUNTRY?



IT

Australia has always had a reputation as a technology innovator and early adopter. Is this reputation still warranted? **Josh Gliddon** looks at the thorny issue of exploiting our intellectual property.

Bob Hawke is remembered for many things, among them describing any boss that sacked workers arriving late after our '83 America's Cup victory as a "bum", and issuing a call for Australia to become the clever country.

Some might say that Australia has always been a clever country. It's not empty patriotism to say that Australians have a well-deserved reputation for doing more with less. We're renowned for our thriftiness and our ability to think outside the square.

"Back in the '60s the Yanks couldn't believe some of the things that we were doing with machinery that was, even by the standards of the time, virtually obsolete," observed Tony Benson, chairperson of Software Engineering Australia, a national network of software engineering centres that were set up by the Federal Government to promote the acquisition and development of quality software products. Benson has had a long association with computing in this country, and now sits on the boards of several startup companies fostered in the Australian Technology Park incubator in Redfern, NSW.

Why did Hawke want Australia to become the clever country? Australians are avid consumers of new technology. Nearly 40% of Australians own a mobile phone, one of the highest levels of ownership in the world. We were among the first to own as many VCRs as TVs, and we're

enthusiastically embracing the Internet. Figures released last year by the Australian Bureau of Statistics indicate that 47.2% of households own a personal computer, and 22% of homes have Net access.

Consumption is one thing, but the development of indigenous intellectual property is another. Yet here we also lead the world — or at least we did. In 1949, the CSIRO constructed CSIRAC, the first electronic computer in Australia and the fifth in the world, recalls Professor Emeritus Peter Juliff of Deakin University's School of Management Information Systems. CSIRAC was also the third stored program computer in the world; it used 1.5m long mercury lines.

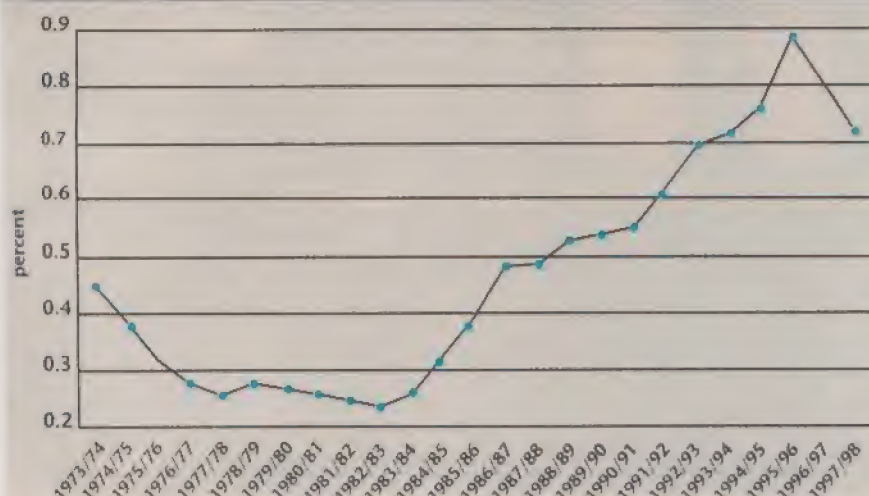
"CSIRAC was driven by Dr Trevor Percy, who passed away a couple of years ago," Juliff said. "To the best of my knowledge, Trevor never received any award or public recognition for his achievements."

CSIRAC was used for the Snowy Mountains Hydro-Electric Scheme, for engineering calculations in the construction of early skyscrapers in Melbourne and for the design of the Victorian electricity grid. The 2 tonne machine, which utilised 2,000 vacuum tubes, was capable of performing about 1,000 operations a second, a speed that's roughly equivalent to 0.001MHz. This is slow by today's standards, but at the time it was a world-beater, developed and constructed wholly within Australia.

So what happened to this lumbering beauty? It's still in existence, more out of luck than good planning, but it's inoperable and will never run again. "CSIRAC and the program that developed it was killed by the short-sighted Menzies Government," Juliff said. "It was described by the government of the time as a total waste of time, and the CSIRO was instructed to redirect the money to cloud seeding experiments because it viewed Australia's real role as a quarry and farm. Liberal governments have never funded anything cerebral because of the Country [National] Party's obsession with primary industry. Similarly, Labor governments have never supported IT because of its potential to eliminate traditional jobs, and the conflict it would cause with the union movement. So what we've had is 50 years of wasted opportunity."

Did Hawke's call for Australia to become the clever country come too late? After all, Australia nurtured a high-technology hardware industry right through until the early 1990s, when the last remnants of the industry started to fail (see 'Hard times for hardware,' page 115). Or was Hawke simply articulating yet another of Australia's dark secrets: a creeping technological cultural cringe, and a sneaking suspicion that we must be failures because we've never created an indigenous IBM or a local Microsoft?

Australian business expenditure on R&D as a percentage of GDP



Source: ABS

Research and development

We're regularly wowed by reports of Malaysia's Multimedia Super Corridor, and the use of highly trained (yet cheap) software developers by multinationals operating in India. We wonder where our indigenous software industry is, and why Microsoft, Oracle and others haven't established software plants here.

Recall, for example, the unbecoming display by Prime Minister Howard and IT minister Alston when Intel CEO Craig Barrett visited Australia in 1999. It was possible, they said excitedly, that Intel might establish a semiconductor plant here, enhancing local prestige (microchips, manufactured here!) and boosting our balance of trade. Of course, without the tax concessions offered by other nations, nothing ever came of it.

"It would be tragic if we became a net importer of intellectual property," said Professor Chris Peterson, associate professor of computer software engineering at the University of Technology, Sydney (UTS), and a previous chairperson of the Australian Industry Development Program. "Yet if you look at our business expenditure on R&D as a percentage of GDP [gross domestic product], then it appears that we're not putting in the amount of money we need to develop high-technology intellectual property in Australia."

Many industrialised countries — particularly the US and Japan — have business expenditure on research and development (BERD) rates of over 1%. In other words, total business spending on research and

development is more than 1% of gross domestic product for those economies. Australia, however, struggles to muster more than 0.8% BERD. Worse still, BERD has fallen in the last two years (see graph above). Australia, it seems, is simply not spending the money it needs to spend on research and development.

The current government has also cut the tax concession granted to business research and development, from 150% to 125%. "We're now seeing a serious drop in business expenditure on R&D because of this drop in tax concession," Peterson said. "And what support there is from the government is implemented with a scattergun approach. It's clear to me that this government simply isn't supporting research and development in this country."

This view is not accepted by Professor Don Anderson, chairperson of the Industrial Research and Development Board. "It's true that BERD has fallen in 1996/97 and 1997/98, but that's not the entire story," Anderson said. "BERD had been on a steady rise since 1982, and the fall can be directly attributed to declines in the manufacturing and mining sectors, which have traditionally been heavy spenders in R&D."

"Excluding the mining and manufacturing sectors, BERD has actually grown by 7% year on year," Anderson attributes this to government initiatives designed to encourage business to innovate and to promote research and development. "This government is very keen on building local intellectual property through the Industry Innovation Fund, and through its encour-

agement and participation in getting the venture capital industry kick-started," Anderson said.

Two programs enjoy strong government support. The R&D Start program, which matches industry research and development funding on a one-for-one basis, has been seeded with \$700 million of government funds through to 2002. To date, \$190 million has been allocated to 236 projects, which are assessed on three criteria. First, the projects are assessed to see whether they have what it takes to succeed. The management of the business is also assessed to see whether it can make the project work. Finally, the project has to be in the national interest, which is an amorphous criterion assessed primarily on whether the project will have a spill-over effect into the national economy.

Is this enough money to help R&D efforts build exportable Australian intellectual property? With \$380 million spread across 236 projects, each project has been allocated an average \$1.61 million. And not all of those projects are IT&T related.

Software

Successive Australian governments have managed to kill off most of the local hardware industry through apathy and lack of support. Overseas technology has always been seen to be superior, and therefore government funding and purchasing decisions have leaned more towards software and services. And Australia has built an industry based on intellectual property in this area. Only the US and UK software industries are ahead of Australia's in terms of raw exports.

It's said that Australia was built on the sheep's back, and we're still heavily reliant on mineral resources and primary products for the bulk of our export dollars. But what is not generally known is that in Australia, software exports rank fifth in terms of overall export dollars earned. What's more, unlike places such as India, Australia is a net exporter of intellectual property. We haven't yet become a coding sweatshop for multinational corporation.

Anderson points to companies like LookSmart as an example of our success in developing local software and services organisations. Juliff looks at it another way. He's of the opinion that the only reason we've got any sort of software industry is because governmental mismanagement couldn't kill off the local industry, no matter how hard it tried.

"Companies like Aspect and Ferntree have been responsible for placing earnings from the sale of software in the top bracket with our traditional primary products," he said. "The software industry simply couldn't be stifled."

The present government's efforts to encourage a venture capital industry have been successful. The total volume of money available as venture capital has been on a steady rise since 1994, when there was approximately \$2 billion available. This increased to \$3.1 billion in 1995 and reached over \$4 billion at the end of 1997 (the latest figures available — see graph below).

The Innovation Investment Fund Program (IIFP) saw the Federal Government commit \$230 million into a pool for venture capital. The IIFP had the stated goal of matching available funding on a 2:1 basis. "Again, LookSmart is a prime example, and the government has seen a significant return on its investment," Anderson said. "Ultimately, we'd like to see the government out of the VC game — it's not its natural place. To do that, the local VC industry has to get to the point where it can weather any downturns in the domestic or international economy."

"Although the Federal Government has been successful in fostering an environment that supports venture capital — the reforms in the taxation system, whereby capital gains have been reduced, have contributed to this — we're still never going to have a local Microsoft or Dell," Benson said.

His reasoning is based on the size of our market and something that's a little more innate. "At some point we're always going to have to go offshore to find money and to find markets, and we're getting better at looking offshore for those things."

In the past, according to Benson, Australians were too focused on the local market and didn't look offshore. The Internet and the deregulation of the telecommunications environment have done a lot to make us more outward looking. But the core of the matter is something that's linked to our national and cultural identity — our Australianness. "In the US, money is easy to come by, but they never approach it from that direction. They're much more marketing driven. They don't build something and then wonder who they can sell it to. At the very beginning they're thinking about how a product is going to be taken to market, and then where the money is going to come from," he said. "We don't do that here, and I think that it's something that's as much cultural as it is anything else."

"In essence," Benson said, "I don't think that we've got a technology cringe, or a cultural cringe. We've got a marketing cringe."

Education

Australia's education record is enviable. We've consistently managed to deliver a high rate of university graduates, as well as attract large numbers of overseas students. But do cuts in government spending, and policies designed to encourage

Hard times for hardware

Ever since the PC platform became standardised largely in the early 1990s, it has been an uphill battle for the local hardware industry to survive. Higher wages, extra shipping costs for export from Australia to other world markets and few opportunities for differentiation, except in price terms, meant that most manufacturers were driven to the wall or forced to change strategies during the decade.

The most famous example is Osborne Computers, which was the top-selling PC manufacturer in Australia in the early 1990s, but went bankrupt in 1995 (its remnants were picked up by Gateway). Osborne's problems — expensive regional service offices and pricing disputes with Microsoft, which led to an ill-fated attempt to ship OS/2 as standard on all machines — weren't entirely typical, but the company's collapse proved that being the biggest seller isn't always enough to maintain a presence.

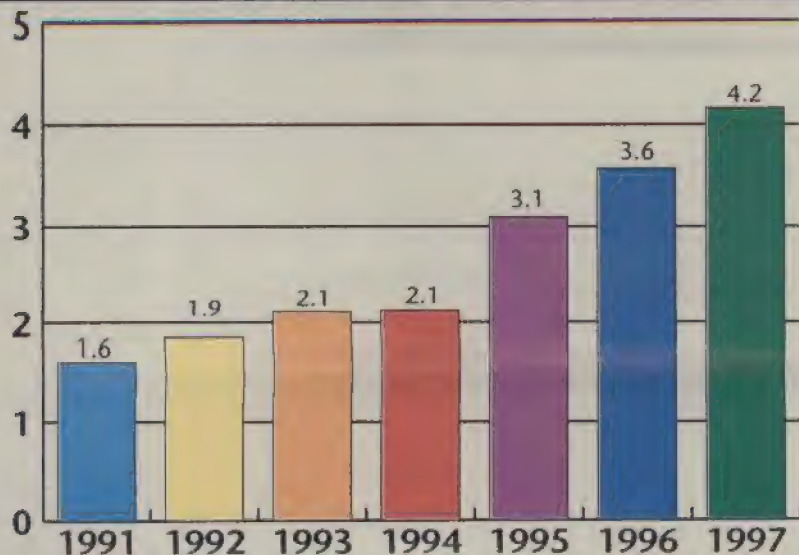
The only remaining local PC manufacturer of note is Ipex. However, Ipex's PC-building activities are now entirely driven by its pursuit of large government and corporate contracts — just try finding a machine at retail level.

To add to the woes of hardware manufacturers, Federal Government policy has not been sympathetic to them either. In 1997, the Coalition broke a pre-election commitment by axing the computer bounty, a tax-driven subsidy allowing an offset of 8% of manufacturing costs. Back then, the bounty cost an estimated \$50 million a year; now, only a handful of businesses would exist to qualify for it.

The handful of current hardware companies still listed on the ASX also demonstrate the perils of the market. While Net stocks that are yet to turn a profit are soaring, companies such as modem maker NetComm have languished around the 40 cent mark for most of this year. NetComm's plans to merge with fellow hardware business Hypertec last year eventually collapsed in acrimony, and Hypertec (which itself bailed out of the PC business in 1997) was bought out by Danish company MCT.

Angus Kidman

Australian venture capital pool 1991 to 1997 (in \$ billion)



Source: Australian Venture Capital Journal

institutions to seek private funding undermine our efforts to train people who will develop Australian intellectual property?

Peterson thinks so. According to him, Australia did a much better job of training engineers back in the '60s and '70s than we're able to now. "There simply isn't the funding that will give students access to decent, up-to-date equipment," he said. "Australia's education is being sold short by the Federal Government."

Part of the problem is the rate of technological change. Two decades ago, equipment may have lasted for three to five years. Now we're lucky to get a third of that time out of equivalent tools.

Peterson advocates taking funding from less vital areas and pouring it into developing computer science and engineering courses. "I'm a believer in market forces, but I'm also well aware that there are times when market forces simply aren't adequate. Education is one of those areas where the government needs to get involved and provide directed funding."

He also believes that industry needs to play a greater role in supporting higher education. "We don't have a culture of close ties between academia and industry here in Australia. That's something they do have in the US, and it's something that works very well there."

One solution Peterson sees is for the Federal Government to provide specific tax incentives, above and beyond the existing tax deductions available for contributions to higher education.

Not surprisingly, he also takes the position that closer ties between education and industry are required. He thinks that the government hasn't gone far enough with university funding cuts, and that running a university is like running a business. "In business, when management gets lazy and the business loses sight of what they're doing, they need to be pruned back to the core and then allowed to regrow. The same thing needs to happen in the universities."

So who's right? Peterson thinks that we're selling our students short, while Benson thinks that the best thing we can do for students is to encourage competition in the university sector. The proof, it seems, is in the pudding — both agree that Australian students are among the best in the world. Benson believes that our culture and our unique outlook on the world will help keep us ahead of the pack.

"Australians are iconoclasts," he said. "We're willing to question things, and to

take an alternative view. While we may still have to deal with the tyranny of distance in terms of accessing world markets, we're also insulated from what I would call the lemming-like attitude of the Americans." He believes that because we have less money available, we're not as likely to jump on a bandwagon without giving careful thought to the implications.

In the last 10 years, Australia has seen regional economies go through the roof and then plummet back through the floor. We've seen some countries, like India, create high-tech export industries from scratch, and we've seen others, such as Malaysia, move to embrace modern telecommunications infrastructure and the Net without compromising their culture. In the meantime, Australia has quietly become one of the most wired, telecommunications-friendly nations on earth in all areas bar one — we're not embracing business-to-business e-commerce with the same enthusiasm as the US and some Scandinavian countries.

"There are times when market forces simply aren't adequate. Education is one of those areas where the government needs to get involved and provide directed funding."

It's a great shame that we've embraced the Internet without really understanding what it can do for business. By 2002, US businesses will conduct an estimated \$1 trillion in transactions using Net-enabled infrastructure. More significantly, that figure will engender cost savings of nearly \$US2.2 trillion.

"We've seen the rise of the dot com, and that's where all the attention is focused," Cisco senior vice-president Howard Charney said. "But the problem is that dot com business is really about business to consumer, and that's not where the action is. The real action is in business to business, by making business transactions more efficient and reducing overhead."

Sad to say, Australia just doesn't seem to get it. "There are a lot of companies locally that are looking at the Net as a stock market play. They more or less cross the Net off their checklist once they've managed to start up some sort of Net subsidiary," Cisco's local managing director Terry Walsh said. "The real news would be if a company made an announcement and said that they had integrated their supply chain, reinvented

their processes and then looked at ways of automating them. Few organisations realise this, although to be fair, awareness is increasing. But it's increasing very slowly."

Cisco executives aren't the only ones levelling the 'don't get it' criticism at Australia. Allan Mendelowitz, vice-president for the Economic Strategy Institute in Washington DC, said that Australia is still well behind the curve in two key areas: the uptake of broadband infrastructure and the use of Net technologies for business-to-business e-commerce. "The Internet is a 24 by 7 environment, and it provides huge opportunities for countries like Australia to compete at a global level," Mendelowitz said. "The problem is that Australia generally isn't doing that. You still don't have effective competition in telecommunications, and awareness of the benefits of Internet technology is still very low."

What can be done? For starters, Mendelowitz believes that the government needs to stay out of the Internet — in the sense that it needs to avoid levying fees and charges on Internet transactions, or putting in place laws that will hinder the uptake of new technology.

Charney agreed that the government mustn't fall into the trap of viewing the Net as simply another stream to tax. "Business and consumers already pay tax on earnings and on

goods and services. The last thing anyone needs is for governments to put taxes on actual Net-based transactions. All that will do is stifle the growth of the Net and Net-based economies."

Alpha and omega

When Hawke called for Australia to become a clever country, we already were, and remain so. We're avid consumers of technology, but that doesn't reflect our ability to develop and market our intellectual property, because it's far easier to consume than it is to produce.

What we lack is the ability to market ourselves, and to believe that we have something that other people want. We have the ideas and a unique take on how to make them work. In order to grow, we must move forward and keep on moving forward; we need to embrace the world. The Net gives us the opportunity to do so, but we have to shake off our cultural cringe. Perhaps Hawke, instead of calling for the clever country, should have called instead for the confident country. ■

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VOICE RECOGNITION

OK buddy, the game's up!
I know you can talk.
Now where are the
missing files?



The ability to converse with your computer has long been the preserve of science fiction. We're still a long way from two-way conversations, but current technology allows us to tell our machines what to do, or have them read aloud. APC has reviewed the three commercial voice recognition packages available for talking to your PC, and three text-to-speech programs that allow it to talk back.

By Darren Ellis

Movies and advertising would have you believe that we can talk in normal tones and sentences to our machines and they can respond. A few years ago this was pure fiction, but these days — with faster processing abilities and better recognition engines — we are getting closer. The recognition algorithms used in the voice recognition packages reviewed here allow for very natural speech, but it still can be a little stilted.

The three packages APC reviewed are Dragon NaturallySpeaking Mobile Organiser, IBM ViaVoice Pro Millennium Edition and Philips FreeSpeech 2000.

Dragon Systems was recently acquired by Lernout & Hauspie, the manufacturer of rival software Voice Xpress, in a \$US539 million deal. This leaves only two main rivals — Philips and IBM. Lernout & Hauspie has recently been focusing more on voice recognition for integrated devices and peripherals than retail software, whereas Dragon has always focused on the retail side of the market. It will be interesting to see what products will emerge from the two speech recognition research and development labs in the future.

Siliconversations

Apart from the obvious things you need to run voice recognition (software, a

soundcard and a speaker/microphone), the components that most affect how well it runs on your system are the hard drive and processor. Voice recognition is a hungry beast. It takes up a lot of space. A personal profile uses a great deal of hard drive space and you might want to set up multiple users.

Working from a generic speech pattern file, the software listens to how you speak during the training phases and models new patterns on that from an amalgamation of both the old and new data. The software is constantly learning too, so those pattern files grow the more you use it.

Voice recognition is also processor-intensive. Simply put, to recognise speech, the software listens to the words spoken and then makes the most accurate guess it can as to what was said. To do this, it matches against the voice pattern profiles for the current user. Once a few words are recognised, it tries to put the words in context and make intuitive guesses as to what each should be. This takes a lot of processing power and creates a delay between words being spoken and them appearing onscreen.

This is floating point processing — something that the Intel Pentium II performs sluggishly. The Pentium III is better at it (voice recognition was one of the many uses the Pentium III was hailed for),

but now the AMD Athlon is superior. APC tested the software on both a Compaq Deskpro with a Pentium II 300MHz processor and 64M of RAM and a Packard Bell Platinum Pentium III 800MHz with 128M of RAM, and you can see the difference the Pentium III makes. But don't let this discourage you from trying voice recognition for yourself. It still works well using a PC with lower specifications.

Talking back

Text to speech (TTS) has been around for years and is a much simpler concept than voice recognition. It begins with simple text and usually works phonetically. There are no intricate dictionaries or speech patterns to follow. The biggest drawback with TTS is that the voices provided are usually dull and impersonal. To get around the droning of a machine talking to you, some developers provide voices with accents and unusual pronunciation and there are often several male or female voices to choose from.

TTS is best used for reading aloud your letters or emails, freeing you to do other things. All of the voice recognition programs reviewed featured TTS in one form or another, and APC looked at some smaller TTS programs available on the Net. Windows 2000 also contains text-to-speech features.

Dragon NaturallySpeaking Mobile Organiser

There are four versions of Dragon NaturallySpeaking available: the NaturallySpeaking Mobile Organiser, Mobile, Preferred and Standard versions. APC tested the NaturallySpeaking Mobile Organiser, which includes the Preferred software and a device called the mobile organiser (see below). Each package has identical software, the same recognition engine and, for the most part, all have the same abilities. Some functions, however, are pared down or nonexistent in the Standard version.

APC has reviewed NaturallySpeaking Mobile before (see APC April 1999, page 42), and we've always been impressed with the advances made in each successive version. The software in version 4 has better response and recognition rates than ever before.

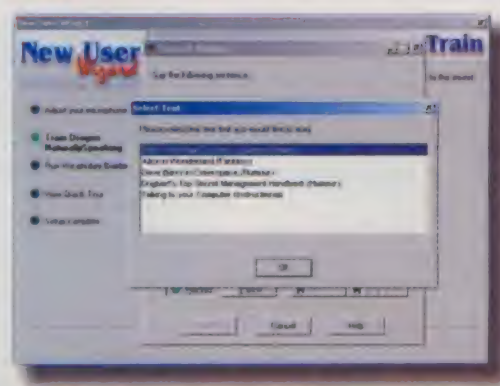
When IBM released voice patterns for the Australian accent with ViaVoice 98, the recognition rates increased dramatically. It's pleasing to see that Dragon has followed suit. Besides the standard US and UK versions, it now has English versions for the Indian subcontinent and South-East Asia as well as for Australia. These versions include dictionary additions for colloquialisms, slang, street names, place names, and flora and fauna.

The mobile organiser is basically a handheld voice recorder that enables you to dictate notes and appointments on the road. You can later connect it to your PC to upload or download data and recordings,

which the software converts to text. The mobile organiser acts as an extra drive on your system, but connects to the PC in an unusual way. The unit has a USB connection, which converts to a straight serial connection on the PC end of the connector cable. This is fine for older PCs, but a straight-through USB cable would have been better, especially as faster processors can have a marked effect on recognition rates and speeds. The organiser works with existing PIM clients such as Symantec's Act, Microsoft Outlook, Palm Desktop, Lotus Notes and GoldMine, and it is useful for travelling.

Training the software to recognise your voice is easy. It takes only a few minutes before you can get started with dictation, but the full training is recommended if you want to achieve the best recognition results. Phrases like 'I'm going down to the Baranduda Milk Bar for a carton of milk and to say g'day to a mate' would normally have a voice recognition program stumped, not to mention 'Gonna have a bonza barbie at a mate's place so bring some snags and chooks'. However, all were recognised correctly. Even mundane speech, such as letter and normal dictation, has a better recognition rate in this new version.

As with FreeSpeech 2000 and ViaVoice Millennium, you can navigate through the Windows interface, including opening and closing programs. You can also dictate into any program you want; the only



stipulation is that it has to be a program that supports text input.

A new feature takes Web surfing to a new level; you don't just enter URLs in the address bar, you can use voice commands to move around within pages. You can also skip forwards or backwards through visited pages.

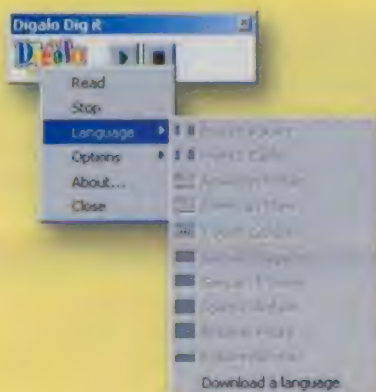
Contact	Auscript
Phone	(02) 9238 6560
Online	http://www.auscript.com.au/
Price	NaturallySpeaking Mobile Organiser \$799, Mobile \$699, Preferred \$349, Standard \$199
In short	Its excellent recognition rates make it worthwhile, but the Mobile Organiser is quite expensive.

TEXT TO SPEECH

Digalo and Digt

Digalo is a program that runs in the background. It's a Speech Application Program Interface (SAPI) TTS that supports SAPI and Microsoft Agent-compliant programs. If you don't have one installed to hear the engine, the Web site offers a free download of the program Digt, which is TTS in its simplest form. Digalo itself is a powerful utility that allows for TTS in many languages — currently there are seven available, including German, Spanish, Brazilian, Portuguese, Russian and French. Even the two English versions we trialled — US and UK — have distinct regional accents.

Digt is a very small program which can be run in its own window, and



comprises no more than a play and stop button. Otherwise, it runs totally from the system tray. Once it is registered, you can swap between languages and even between genders of voice characters. The voices don't sound too computerised; they are more like an unclear recording. The accents are realistic and add some flavour to the program.

Contact	Elan Informatique
Online	http://www.digalo.com/
Price	\$US29
In short	A good program with powerful features.

IBM ViaVoice Pro Millennium Edition

When APC reviewed ViaVoice 98 last year (see APC January 1999, page 44), we were delighted with the Australian voice patterns. They greatly increased the word recognition rates in comparison with UK or US English. Consequently, APC was a little surprised that the Pro Millennium Edition has dumped the Australian voice patterns and returned to UK voices. It still managed to outperform Philips FreeSpeech in this regard, but not the truly Australianised NaturallySpeaking.

There are many add-on speech packs available for professionals. These have vocabularies for fields such as law, business, medicine and intriguingly, one called Chatter's Jargon which features emoticons, abbreviations such as LOL and so on. ViaVoice is also available in Standard, Web and Personal versions. The Standard version is similar to Pro but lacks many of the extras; Web is geared towards surfing the Web with your voice alone (and includes the Chatter's Jargon vocabulary pack); and Personal is a pared-down version of the Standard package.

ViaVoice Pro works well with any program that accepts text input, and it's configured to work with Microsoft Word, Excel and Outlook from Office 97 or 2000. It also comes with its own word processor called SpeakPad, so you don't need to have Microsoft Office installed. SpeakPad is a decent word processor, with good features and functions, but ViaVoice works better

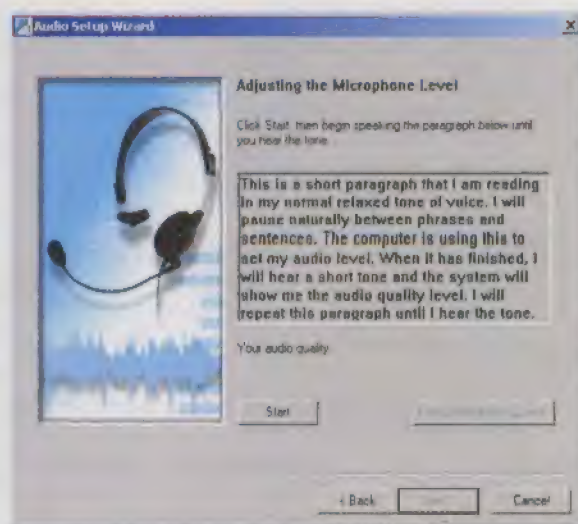
with the full integration within Word.

Like the other two programs, you can navigate through programs and the Windows interface, including opening and closing programs, and resizing or minimising windows. This can be amusing for a while, but is no substitute for the speed of a mouse. As with the other speech recognition programs, you can also dictate into any text-reliant software.

ViaVoice Pro's also features a small text-to-speech utility. This, coupled with the animated agent (a talking pencil called Woody), is great for reading back dictation or email messages.

ViaVoice Pro works with the Internet as well, including major email packages such as Netscape Messenger, Microsoft Outlook, Express and AOL, but not with IBM's own Lotus Notes. Browsing the Internet is easier with ViaVoice Pro, because of its ability to surf by reading links and buttons. This program did a much better job than FreeSpeech 2000 and was almost as accurate as NaturallySpeaking.

The headphones bundled with the package were quite comfortable to wear



and picked up voices clearly and cleanly. However, they were not as good as the FreeSpeech 2000 SpeechMike, which IBM has approved. IBM has a list of alternative soundcards and headsets/microphones on its Web site.

Contact	IBM
Phone	13 24 26
Online	http://www.ibm.com.au/
Price	Standard Millennium \$129, Web Millennium is \$169, Pro Millennium \$369.
In short	Let down by the regression to UK English, but good nonetheless.

TEXT TO SPEECH

ReadPlease 2000

ReadPlease 2000 is a text-to-speech program that is exceptionally simple to use. Its interface is well designed and straightforward. Essentially, ReadPlease looks like a screen with operation buttons down the side. The main text window can have different background colours applied (or 'brightness' as the software calls it) to make text easier to read. Rather than reading directly from programs, it reads text that you copy into the main screen. Text can then be edited and saved as plain text or rich text.

The voices are rather similar and very computer-like (a problem with most TTS



programs), but ReadPlease 2000 has managed to get some inflection into the voices. This is particularly noticeable with quotations and pauses. There are four voice characters to choose from: two

male and two female, and each can be configured for tonal pitch and speed. ReadPlease 2000 is a free download, but there is a shareware version of the program called ReadPlease NetPro that has many more features, including conversion to WAV files.

Contact	Money Tree Software Company
Online	http://readplease.com/
Price	Free download. ReadPlease NetPro \$US49.95
In short	A useful program that is simple to use.

2000

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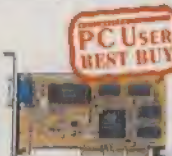
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Philips FreeSpeech 2000

FreeSpeech 2000 tested extremely well in APC's previous voice recognition software reviews, but it has been eclipsed by the latest versions of ViaVoice and NaturallySpeaking. It's still a good recognition program, considering it relies on US and UK English for use in Australia, but in comparison to the Aussie dictionaries and recognition engines in NaturallySpeaking, it falls well behind. There are other languages available for use as a base language, but these are mainly European.

ViaVoice and NaturallySpeaking come bundled with headsets, but the version of Philips FreeSpeech 2000 APC reviewed did not — it came with a SpeechMike instead. This device fits comfortably in the palm of your hand, and combines a speaker, microphone and trackball in one. To make computer commands, instead of saying 'computer' or something similar, there's a button on the underside to hold in until your command is over. The software has over 11,000 control commands alone, which covers many ways of telling the PC the same thing.

This is a much better way of talking to the PC than using the headsets bundled

with the other version of FreeSpeech 2000 and the other two voice recognition programs, for several reasons. First, it won't mess your hair. Second, the microphone pick-up works extremely well — so well that we were able to leave it on the desktop while talking in normal tones. Of course, this only worked up until the time

we needed to use computer commands. Third, the cable is quite long, giving you much more freedom.

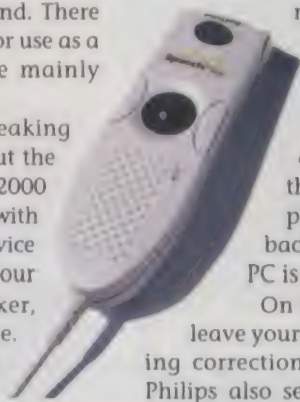
The length of the cables with the headphones are adequate if your PC is on the desktop, but not if you plan on sitting comfortably back in your chair or if your PC is under the desk.

On the downside, it doesn't leave your hands free for instant typing corrections or system navigation. Philips also sells the SpeechMike separately, and it has been approved by IBM for use with ViaVoice.

FreeSpeech 2000, like most voice recognition programs, can be up and running after a brief training session — 15 minutes — but obviously the more you train the software, the higher the recogni-

tion rates will be. FreeSpeech 2000 was one of the easiest and fastest programs to train, but once it was fully operational, the recognition rates were not as good as in the other programs.

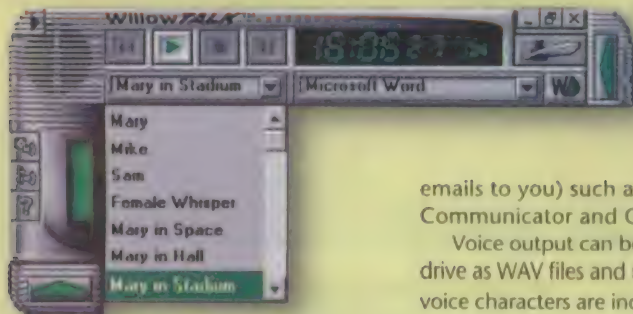
FreeSpeech 2000 allows you to navigate through Windows, as well as dictate into popular word processing programs (it's optimised for Microsoft Word and Corel WordPerfect) or any other program that supports text input. FreeSpeech 2000 was the first voice recognition program with the ability to really surf the Web, beyond just dictating addresses into the URL bar. You can click on text links within pages by reading them, but this will only work if the actual link matches the text.



Contact	Harvey Norman
Phone	(02) 9201 6111
Online	http://www.speech.philips.com/
Price	\$249 with headset
In short	Excellent with the SpeechMike, and cheap by all accounts, but the recognition engine would be improved with the addition of Australian English.

TEXT TO SPEECH

Willow TALK 2.5



Willow TALK 2.5 is a simple, friendly program that can detect which open documents or programs to read from. From this list you select what you want to hear and off it goes. It has some impressive features, including support for email programs (so it can read your

emails to you) such as AOL, Netscape Communicator and Outlook Express.

Voice output can be saved to the hard drive as WAV files and nine customisable voice characters are included. You can also create scripts or plays and have different characters speak their lines in turn.

Contact	Willow Pond
Online	http://www.willowpond.com/
Price	\$US39.95
In short	A good program, with a neat uncluttered interface.

Editor's Choice



Dragon NaturallySpeaking Mobile Organiser

ReadPlease 2000

Highly commended Philips FreeSpeech 2000

Out of the three main voice recognition programs APC reviewed, Dragon NaturallySpeaking is the best example of high-accuracy voice recognition. This is due largely to the Australian voice patterns in this version. If IBM had continued to include Australian patterns in its ViaVoice software, it may have been the winner here.

For text to speech, ReadPlease 2000 is a decent program, it works well and is totally free.

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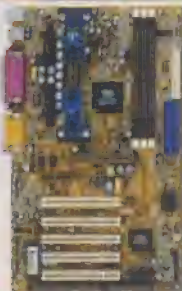
SL-02A++ C-Tune
FC-PGA & PPGA Adapter

SL-77KV

VIA KX133

AGP 4X

FSB 200 MHz



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- AGP 4X Mode
- AC'97 Sound
- Ultra ATA/66
- Hardware Monitor
- BIOS Writing Protection
- STR(suspend to RAM)

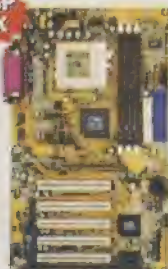
Soltek SL-77KV vs. Asus K7M...

Test Item	Soltek SL-77KV	Asus K7M	Testing Environment
BAPCO SYSmark2000	111	112	CPU:AMD Athlon 500
Content Creation Winstone 2000	22.8	23.8	Memory:KingMax 128MB SDRAM
WinBench 99 1.1 Hi-End Disk Winmark	12400	12000	VGA:Creative GeForce 256 Pro
Quake3:Normal Quality (1024X768)	79.3	75.10	Direct7.0a
Quake3:High Quality (1024X768)	61	56.2	16bit true color
			Solution 1024X768
			Frequency:75Hz
			Hard Disk:IBM DJNA-371350 13.5 GB
			CDROM:TEAC 32X CDROM
			OS:Windows98 SE4.10 2222A
			Source:PC SHOPPER (2000.3/NO.16)

AGP 4X

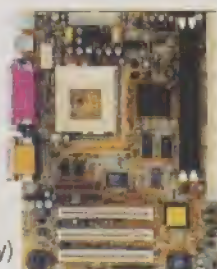
SL-65JV-X

- VIA VT82C694X+596B
- FSB 133MHz
- AGP 4X MODE
- Ultra ATA/66
- BIOS Writing Protection
- **VD-TECH** (Voice Diagnosis Technology)



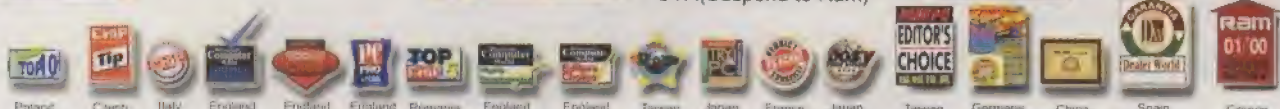
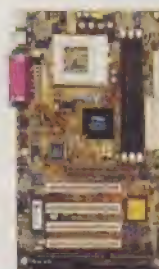
SL-65H60

- Intel 810
- Micro ATX
- FSB 100 MHz
- Integrated AGP Graphics
- AC'97 Sound
- Ultra ATA/66
- Hardware Monitor
- STR(Suspend to Ram)



SL-65FV*

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- ATX
- FSB 133MHz
- Ultra ATA/66



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Inside our renovations

Welcome to the May edition of Workshop. This section has something for everyone, from the absolute beginner to the advanced DIY guru. The operating systems columns take you through a range of simple computing procedures to help you come to grips with your OS. We also bring you advanced discussions of the technology driving the IT industry and in-depth programming tutorials.

As you thumb through the following pages you'll notice that Workshop is in the midst of a few renovations. This month we've added a couple of new rooms to Workshop: *Bibliofile* and *Insite*. *Bibliofile*, which has moved from the After Hours section of the magazine, reviews the latest technical publications to hit the shelves. *Insite* is devoted to helping you enhance your Web site and improve your content management skills.

To make your Workshop experience as hands-on as possible, make sure you drop the APC cover CD into your tray and check out the Workshop section. It contains all

the sample files mentioned throughout Workshop and a selection of shareware that has been tested and reviewed by APC experts. You'll find a summary of this shareware alongside each OS column.

While you're browsing the CD, you'll come across an enormous range of the latest shareware and freeware, freshly plucked from the Web by APC's CD team. For a complete listing of CD contents, turn to page 8. **Andrew Colley**, Workshop coordinator

Workshop is a reader-input section. Please send your ideas, comments or criticisms to workshop@acptech.net.au, or to our snail mail address **APC Workshop**, PO Box 4088, Sydney NSW 1028. Alternatively you can join one of the online discussion forums at apcmag.com to raise technical issues with fellow DIY enthusiasts or voice your opinion on any topic featured in Workshop. A full archive of Workshop articles can be found at <http://apcmag.com/workshop/>.

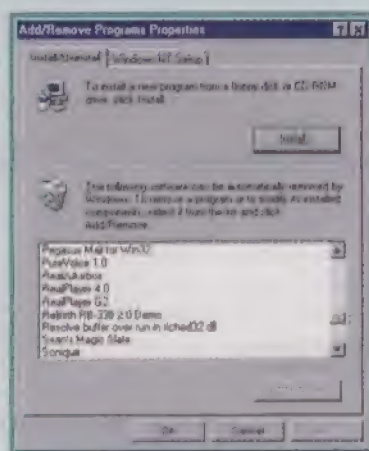
Bug of the month

Bugmeister John Kyle tried to clean some unwanted programs out of his NT system, but just couldn't bring himself to delete the program with the catchy name 'Resolve Buffer overrun in riched32.dll'. No sense of adventure.

Win! Win! Win!

Workshop is always on the lookout for the most interesting, strange, funny or downright weird software bugs you can find. These include code snippets, features that function poorly, or things that crash a particular application. Anything and everything buggy deserves mention.

Send us your favourite bug via email to bugs@acp.com.au or snail mail to APC Bug of the Month, PO Box 4088, Sydney NSW 1028, and you'll be in the running to win a software prize. Please send screen captures, example code listings or detailed instructions to



trigger a bug in an application, as appropriate for your entry.

The winner's name, along with details of the bug, will appear in this column in APC July. So start hunting! **Michael Smith**

Contents

This month in Workshop

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The CPU is one of the most fundamental elements of your PC, yet it remains shrouded in mystery. **By Alex Kidman**

Technobabble

Last month, Technobabble looked at the development of integrated circuits and why the invention of silicon-based manufacturing technology was such a triumph for computing (see APC April, page 130). This was the era where each individual component of the computer (still a long, long way away from earning the prefix 'personal') used a separate IC. This month, we look at the next step in the birth of the computer: the arrival of the CPU, a single unit capable of performing all the calculations necessary for computing. The CPU's name is derived from its function. Systemically CPUs occupy the nucleus, or brain-centre, of any computer and their main task is processing.

What is a CPU?

A central processing unit is a device for computation. CPUs are typically made up of three core components: the I/O system, the CU and the ALU. In order of appearance, these acronyms stand for: input/output system, the control unit and the arithmetic logic unit.

These acronyms may sound a little baffling, so let's consider a computer's mode of operation before examining them in detail.

Imagine you have written on a piece of paper two numerical values that you want to add together. As a visual representation of two quantities, you can think of the paper as the input medium to your brain. An entity that we'll call 'you' controls the flow of those inputs to your brain. Your brain does the actual mathematical work of adding the two numbers, then passes the output back to you. You then command your hand to use a pen or pencil to write the answer onto your output medium — the piece of paper.

A CPU operates in a very similar way. The difference? Let's look at the core functions of a CPU in detail and see exactly what they do.

I/O system

Input/output registers control the flow of information to and from the CPU to other functional parts of the system. Simple processors could get by with a simple array of buffers that hold information and release it as required, but I/O systems in modern CPUs are far more complex.

To send or receive data the CPU needs two essential pieces of information about it: what is it and where is it going? The CPU answers these questions with a little help from the input/output system. What is it? It's data and it travels along the data bus. Where is it going? To an address on the address bus. The I/O system regulates these buses.

CU

The control unit is the heart of the CPU. As its name implies, the CU regulates the flow of data to and from its core processing centres. It's up to the control unit to decide where data will go in a logical manner. The faster the control unit can assess the nature of the data being pushed around and allocate resources to it, the faster the system will work.

ALU

If the CU is the heart of the CPU, then the ALU is the stomach where all the grinding and churning goes on. In other words, the ALU is where all the processing takes place. In a simple CPU you'd only find a very basic ALU, which limits the overall functionality of your processor. Modern CPUs contain multipart ALUs with separate components for handling integer and floating-point (decimal and complex functions) calculations.

CPU genealogy

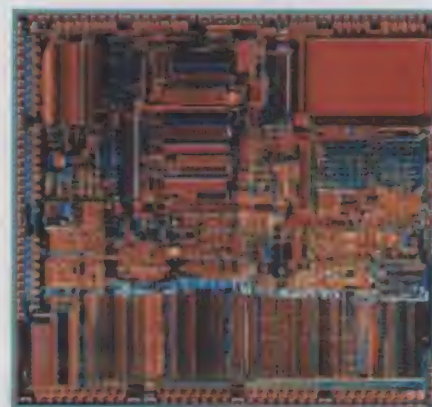
The first product that can be recognised as an ancestor of the modern CPU was

produced by Intel back in 1971: the 4004. It had a grand total of 2,300 switches, making it a lightweight compared to modern processors that have millions.

The PC didn't really take off until Intel started manufacturing 16-bit processors for IBM. While other companies such as Texas Instruments were also making CPUs, IBM (the Microsoft of the mid-70s) chose Intel's 8088 as the CPU for its nascent PC range. Lightning fast for its day, the 4MHz 8088 quickly established a dominant position in the market.

The rise and rise of the x86

The immediate predecessor to the 8088, the 8086, was also a 16-bit processor. Interestingly, the 8086 did something the 8088 couldn't; it addressed the rest of the system at a full 16 bits, whereas the 8088 could only manage 8-bit communication exter-



Intel's 386DX

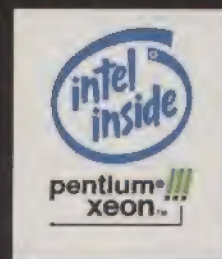
nally. IBM adopted the next processor in the x86 series, the 80186 (also called the 186). The 186 was manufactured using a 1-micron process. This was considered to be revolutionary at the time, but if you recall our discussion of the chip manufacturing process in last month's Technobabble, we mentioned that modern manufacturing techniques can produce pathways as narrow as 0.18-microns.

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The 186's successor, the 286, was the first processor in the x86 series capable of multitasking. Theoretically, its protected mode operations allowed the system to work on several processes simultaneously.

Intel made the jump from 16 to 32-bit processing when it delivered the 386 generation of processors. Having made the processor faster, it was time to make it more intelligent. The next iteration of Intel's x86 chipset, the 486, included a math coprocessor for floating-point calculations.

There's no safety in numbers

The x86 suffix served as the basis for Intel's processor numbering and model naming systems. Unable to trademark numbers, Intel's processor nomenclature seeped throughout the industry. That meant anyone could make a processor and call it a 486. To distinguish its brand from competing processor manufacturers, Intel dropped its longstanding x86-based naming scheme and started marketing its chips under the trademarked name Pentium.

Other branding exercises have led to other standards. For example, Apple Computer uses Motorola's PowerPC processor series, which work in a different way to x86-based chips for much the same results (see 'RISCy business' below). AMD's line of processors uses the 8086-derived design principles, but eschews the Pentium nomenclature.

Intel has maintained its market dominance since the early '80s, and even with strong challenges from AMD (and weaker ones from Cyrix) it's still the brand name most commonly associated with CPUs.

Speed numbers

So you've just spent six grand on a 1GHz processor system. It's sexy, it's fast, and you'll be short of rent money for the next

30 weeks or so. But what does the 1GHz specification actually mean?

The speed rating of a processor relates to the number of electromagnetic pulses that an oscillating clock within it can pass through. 1GHz is 1,000,000,000 hertz, which is an awful lot of individual pulses. Each pulse can represent a command within the CPU, although that varies with processor design, the overall speed of the system bus and other factors such as memory.

RISCy business

For quite a while most processors were designed using what eventually came to be called CISC. CISC stands for 'complex instruction set computer'.

CISC-based processors can perform large sets of complex mathematical functions internally, although it executes them relatively slowly. As a result, CISC-optimised programs don't need to be big or break down complex equations into smaller chunks (which would bloat the program code — a very important feature in the days of limited memory and low storage capacity).

About 15 years ago, a new design philosophy came along: RISC. RISC stands for 'reduced instruction set computer'. Conceptually, RISC is the opposite of



CISC. The philosophy is simple: hand the task of breaking down complex equations back to the programmer and compiler, while letting the CPU focus on running a small set of simple instructions very quickly.

A RISC-optimised program has a lot more instructions (thus making it bigger), but the CPU is able to churn through those instructions at a much higher rate.

Both approaches have their merit, and today RISC and CISC-style approaches to processor design cohabit in the CPU market. However, the terms are no longer as clear as they were, as

So, you *have* been paying attention

Ian Ivey and John Weedon have both obviously been reading and comprehending everything up to this point — they both spotted my error in the March column on using Boolean logic for adding purposes. Reward yourselves with gold stars. The error was in the last line of the adding table; the result of passing 1 and 1 through a XOR table should be 0, not 1, giving result of 0, carry bit of 1.

The gold star with purple stripes goes to Jim Wolz, who also spotted a touch of transposition in the binary addition of the same issue, where it appeared that 111 + 100 equals either 1101 or 1111, when in fact it equals 1011. Which just goes to show that perhaps we should leave simple addition to computers — not me!

Alex Kidman

most CPU designers are using elements of both techniques in their processors. Conventionally, Intel's processors (the x86 line) have been considered CISC processors, as have the Motorola 68K processors. But the PowerPC from IBM and Motorola, Sun's Sparc and the Compaq Alpha (to name a few) are perceived as RISC processors.

That being said, the Pentium II, Pentium III and AMD's Athlon processors all borrow heavily from RISC designs; fundamentally, they are RISC processors with a CISC 'shell'.

The next step in processor technology is the development of VLIW (very long instruction word) processors, in which multiple equations are packed into a single instruction.

A number of VLIW processors already exist for specific purposes and at least one is set to become a major desktop and server processor. Intel's Itanium processor (formerly known as Merced) uses an advanced VLIW design to deliver high-speed instruction execution.

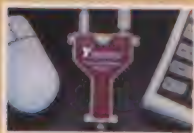
Each month, Technobabble explains the basics of PC technology for users who are new to the world of computing. Alex Kidman can be contacted at alexk@acptech.net. For a complete archive of APC Technobabble columns, see <http://apcmag.com/babble/>.

Intel processor history

Processor	Year
8086, 8088	1978
80286	1982
80386	1985
80486	1989
Pentium	1993

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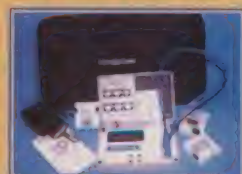
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The growth of application outsourcing has redefined the client/server relationship. By Nathan Taylor

Core

Sydney's recent Application Service Provider (ASP) conference highlighted the growing focus on IT outsourcing. Application outsourcing has been possible for some time, but now it is poised to expand beyond the boundaries of the niche to which it was previously confined.

Technology that can run an application on a server and deliver its visual interface to a thin client has been available since the days of mainframe computing, when green screen terminals served as front ends that connected directly to a mainframe.

The development of corporate networks improved on the mainframe model by making the link between mainframe and terminal less umbilical. The need for terminals to plug directly into the mainframe was removed by allowing them to control functions via TCP/IP, or some other protocol. Telnet is a remnant of those days. At least as far back as the inception of the X Window System, client terminals have been capable of displaying more than simple textual display; they can now view and control full GUI applications running on a remote system.

A decade ago, a company called Citrix expanded that capability beyond Unix-based systems. They developed extensions that made it possible for remote clients running the Citrix software to access applications running on a Windows NT server. This capability has partially been built into Windows.

Since then, there have been sporadic attempts to develop similar technologies. Some, like Insignia's NTrigue, use protocols licensed from Citrix or the X Window consortium; others, like Sun, developed new protocols independently. Citrix remains the most common means of accessing Windows applications (although Microsoft Terminal Server is becoming increasingly popular), and you can find an X server on almost every Unix system.

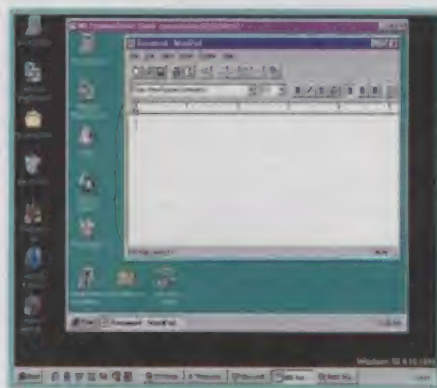
There are numerous advantages in running applications on a central server. The key benefits come from centralised management. An administrator can control who has access to specific applications. You only need to install new

applications or apply upgrades at the server, rather than on each system on the network. It's easier to centralise the storage of data files. When a terminal breaks down you just need to replace it. These arguments may sound familiar; they accompanied the failed network computer 'revolution' of a few years ago.

The centralised application server model is the base mechanism that ASPs need to deliver their products to customers. The applications themselves can be hosted on a system managed by the ASP, and the customer only needs to log on remotely to access those applications. No muss, no fuss.

The X Window System

Unix users are probably scratching their heads at the publicity Citrix's MetaFrame is getting at the moment. The X



Windows Terminal Server in action

Window system has been their GUI of choice for all Unix distributions for many years. The X Window System was designed for multiple users from the ground up, and it doesn't require display and input devices to be on the same system as the one running the applications.

The first commercial product based on the X specification was released in 1986, and since then many versions of the X Window server have been created for a wide range of platforms. Compatibility between these versions is maintained by a standards body called X.Org, which ensures that X Window clients and servers can communicate with each other properly, regardless of the platform. For instance, an application running

on Solaris should be accessible to a terminal running Linux, as long as both comply with the specification. The latest compliance specification is called X11R6.

The vast majority of X Window variants used across the entire range of Unix platforms support X11R6. Even XFree86, the variant of X Windows used in most Linux and BSD installations, is compliant with the standard. If you're really keen, there are even X programs for Windows that allow applications running on a Unix system to direct their output to a Windows PC (so you can wow your friends by running Linux applications under Windows). The inverse is also true: NTrigue can be used to allow somebody with an X-capable terminal to launch a remote Windows session.

Understanding X

X nomenclature is probably the toughest thing to get your head around. The terms 'client' and 'server' are used in a way that contradicts conventional IT wisdom. X parlance reverses the relationship between client and server in terms of physical location.

In X terminology, an *X client* is an application running at the host, rather than a remote user or system. The *X server* is the graphical display system running on the remote system. The application (the X client) sends instructions to the remote system's graphics system (the X server) about display output: 'draw a window here', 'place this text in this box' and so on. This may seem confusing, but it does make sense when you look at it from the point of view of a programmer, rather than that of a network engineer.

The really clever aspect of the X Window system is that it divorces the means of communication between client and server from the actual content. It doesn't care whether the X client is talking to the X server through an internal system process or across a network. This means that X applications can access an X server over a LAN or Internet connection just as easily as if the X client was installed alongside the X server in a standalone system.

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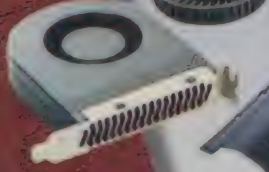
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SunRay

Sun recently launched its own application services and remote display engine called SunRay. Unlike the X protocol or ICA, SunRay is not designed to conserve bandwidth; Sun decided to release a system that burns bandwidth in favour of rich multimedia content. If you try to play a movie over an ICA or X-driven network, you're going to run into serious trouble with lag. SunRay doesn't suffer from those problems, but you do need a very fast network to run it — something in the league of Fast Ethernet.

To date, SunRay can only support Solaris on the host machine, and terminals only exist in the form of a proprietary SunRay box. This could limit SunRay's potential market penetration. Sun claims that it will be licensing the SunRay protocol as an open standard, but this has not happened yet. If Sun does make such an announcement in the future, there may not be anyone listening anymore.

Imagine you're on a corporate network. You're sitting at a system that has an X server (a thin client, or an X terminal will suffice), and there's another system somewhere on the network that has an application you want to run. All you have to do is contact that system, invoke the application, and request that its display output be directed to the system you are working at. Your keystrokes and mouse movements are transferred back to the application running the remote system, but its display output is transferred to your system.

X Windows was designed to be light, so it should operate well over low-bandwidth networks. However, applying it over the Internet could be painful, especially for graphics-intensive applications. X Windows' intelligent design provides remote application access transparently with little overhead and good performance.

Terminal Server and MetaFrame

There has been a lack of productivity applications available for the Unix plat-

form, so the notion of using X has never made much sense to Microsoft Office users. Although this situation has been rectified somewhat in recent years, the office applications most people are familiar with are still built exclusively for the Microsoft platform.

Seeing a need for an X-style system for the Windows platform, Citrix launched a product called WinFrame in 1989. Sporting a protocol called ICA (independent computing architecture), it provided a means for delivering application services to thin clients. WinFrame clients were even thinner than those required for X Window; an ICA terminal could be run on an old 286. The ICA terminal was only required to interpret ICA packets, which contain display, audio and input information. Designed to support bandwidth-limited networks, it could be used over a modem connection as long as few screen changes were called for.

WinFrame is really a custom version of Windows NT 3.5x; Citrix took NT's source code and added the ICA software and extensions necessary to make the operating system multiuser. Citrix then started selling the entire package as a complete operating system.

However, Microsoft withheld the licence to use Windows NT 4.0 from Citrix. Microsoft then licensed the multiuser extensions from Citrix (called MultiWin) and integrated them with Windows Terminal Server (a version of NT 4.0) and Windows 2000, both of which are now available. However, instead of licensing Citrix's ICA protocols, Microsoft developed its own based on the International Telecommunication Union's T.120 application-sharing protocol. Microsoft calls this protocol Remote Display Protocol (RDP). It is also commonly known as T.Share. Citrix has since released MetaFrame, which can run on top of Terminal Server or Windows 2000 to provide ICA services. It has also recently released a version for Solaris.

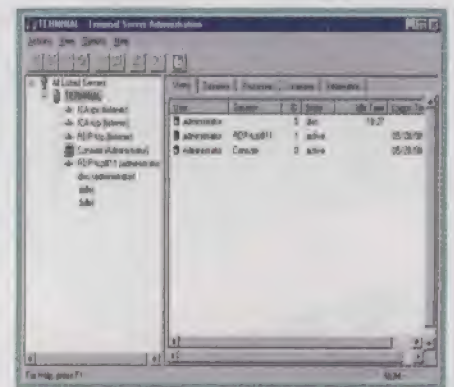
More terminological chaos: Server and client II

To add to the confusion, Microsoft and Citrix use the terms 'client' and 'server' in the conventional sense in their documentation. In their dialects, 'server' refers to the host on which the applications are run; 'client' refers to the terminal where the user is stationed and the visual output is displayed. The stance is indicative of the 'big iron/thin client' philosophy

behind the two companies' products. X.Org seems to focus more on shared and remote computing.

What is the point of using MetaFrame (ICA) instead of Terminal Server or Windows 2000's inbuilt RDP services? From a purely technical standpoint, not much, but MetaFrame has a much better management framework. For instance, the standard desktop delivered to the end user during a Terminal Server session is a complete facsimile of the host machines' desktop, as if the user had just logged on to it. On the other hand, MetaFrame can easily be configured to deliver individual applications, rather than full desktop sessions. (Technically, it is possible to do the same with the Microsoft product by setting up a user profile that only allows access to certain applications, but it is much harder to achieve.) MetaFrame also has additional functions such as a shared local/remote clipboard and local drive mapping support.

More importantly, MetaFrame users can choose from a much wider range of terminal platforms; ICA has been ported to just about every platform conceivable,



The administrative framework for Terminal Server

including Java bytecode. Only a very limited number of clients can access the RDP system, and most of these are Windows platforms (one day Microsoft will surprise us). Neither protocol requires a powerful system at the terminal end (the application runs on the server; all the client has to do is process video and input), so it's not surprising that the market has taken such an interest in simple terminal devices (usually called Windows terminals). X Windows terminals are also available for those who prefer the X protocol.

Nathan Taylor can be contacted at ntaylor@acptech.net. For a complete archive of APC Core columns, see <http://apcmag.com/core/>.

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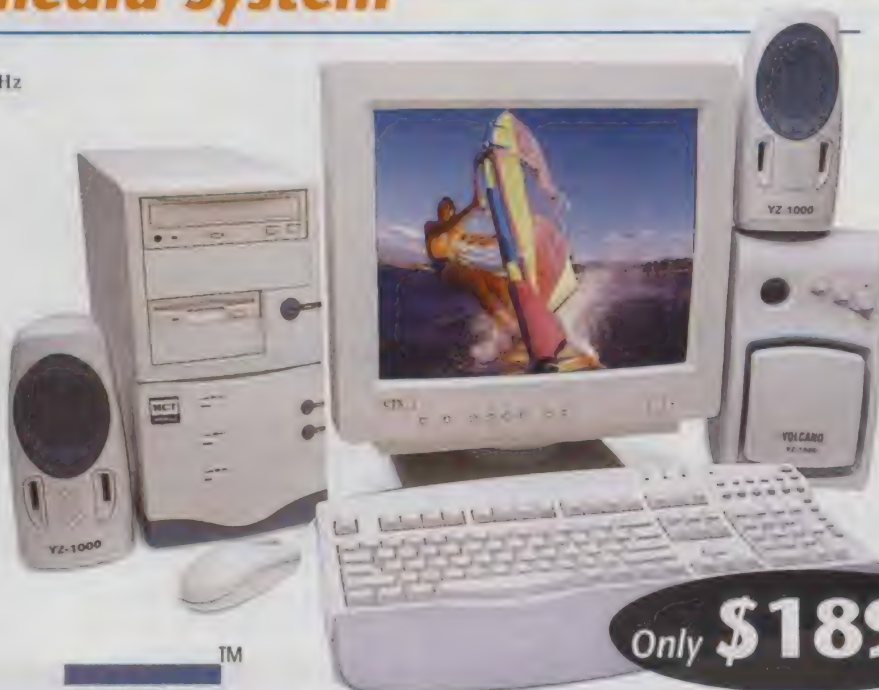


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Microsoft Windows 2000 Professional at a Glance

The 'At a Glance' series from Microsoft Press is well established, and the Windows 2000 Professional volume maintains the high standards of the series.

The object is to deliver the information needed to perform common tasks, and Joyce and Moon achieve this with style. From logging on to sharing files, customising the desktop and managing email, there is a wealth of information with a minimum of jargon for the typical user (system administrators should look elsewhere for a high-end reference manual). As usual, there are also plenty of tips and cross-references.

While the wide page format might not be ideal for your bookcase, it works very well for presenting this type of material. Copious clear and relevant screenshots — typically four to a spread — make it easy to follow the explanations. What's more, each step in a process is keyed to the appropriate item in the image, so there is no doubt about which element you should focus on.

The book is extensively indexed with multiple pointers to the same material. For example, the entries for Briefcase, copying files into Briefcase, copying files to other computers, and moving files or folders in Briefcase all refer to the same

double-page spread. The index failed the test with just one of the terms we looked for — transferring files; it is in the index, but not in this context. Between the seven-page contents and the 20-page index, readers should have little trouble locating the material they need.

If you are looking for a book to provide just-in-time training or a general overview of the new operating system, *Windows 2000 Professional at a Glance* fits the bill. Anyone completely new to computers (they do still exist) or who skipped '90s-style computing might be better served by a more structured approach that puts more emphasis on the context in which the various operations are carried out.

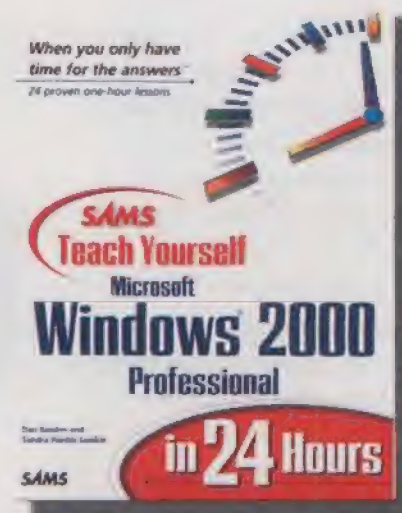
Stephen Withers

Authors	Jerry Joyce and Marianne Moon
Publisher	Microsoft Press
Contact	Woodslane
Phone	(02) 9970 5111
Price	\$34.95
ISBN	1-57231-839-2
Rating	★★★★

Teach Yourself Microsoft Windows 2000 Professional in 24 Hours

Windows 2000 Professional At a Glance is handy for finding the answer to a pressing problem. *Teach Yourself Microsoft Windows 2000 Professional in 24 Hours* provides a structured course that familiarises the reader with the operating system.

The material is delivered in digestible chunks; it should take about an hour to study and complete the associated tasks. As is often the case with computer books aimed at the mass market, *24 Hours* is written with a light touch. Each



hour's quiz includes entertaining bonus questions.

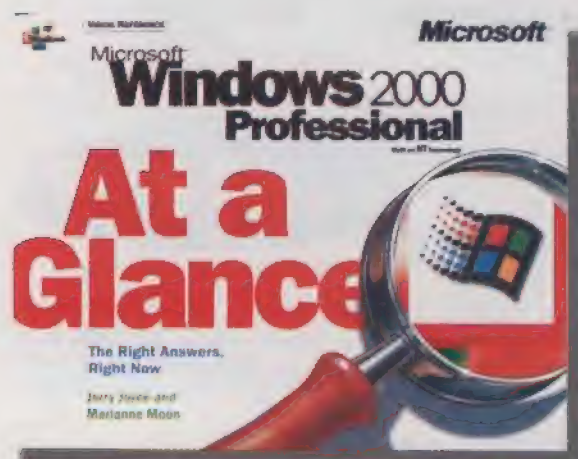
Importantly, the authors have not forgotten what it is like to be a novice; they acknowledge how tricky Start submenus can be for beginners.

The book is heavily illustrated with relevant screenshots, but there are one or two places where a picture would be worth 100 words. For example "a drive that looks like it's connected to the sewer system" is descriptive, but including the relevant icon would have been better.

There are also a couple of items that are at least questionable, such as defining 'newsgroups' as "a whole bunch of people you can email at once". Also, while "most

Bibliofile has moved

From this month, we've moved the popular Bibliofile column into the Workshop section, where it happily sits alongside our other 'how to' columns. Reviews of books on general technology trends and personalities, previously included in the Perspectives section of Bibliofile, are now featured in the 'Off the Stack' section in After Hours (page 205 in this issue).



PCs have only one printer port, so they sport only one printer" might have been true a couple of years ago, the advent of USB means available ports are no longer the reason for having just one printer.

Those converting from Windows 95 or 98 should look for a more advanced volume, but despite the quibbles, this book is recommended for beginners who want to be led by the hand through the basics of Windows 2000.

Stephen Withers

Author Dan Gookin and Sandra Hardin Gookin
Publisher Sams Publishing
Contact Pearson Education
Phone (02) 9454 2319
Price \$29.95
ISBN 0-672-31701-X
Rating ★★☆☆

The Complete Reference: Windows 2000

This reference for the latest version of Microsoft's operating system is an extremely detailed and handy tome — but first a word of warning. This is not a book for the beginner or the enthusiast; it's aimed at power users and network and system administrators. It's not so much a how-to book, but more a reference book that assumes a certain level of reader knowledge.

The book is broken into seven parts, each with its own chapters. Starting from the basics of what is new in Windows 2000, including the important distinctions between Windows 2000 and Windows NT, the book delves right into installing and configuring the system for

different uses. It covers everything from planning installation with regard to network topologies, to unattended network installations and just getting down to actually installing the thing.

If you're planning to migrate Windows NT systems to Windows 2000, there's a chapter that goes into great detail to help you along. The subsequent sections and chapters deal with the basics of the operating system, followed by complex networking issues (protocols, management tools and so on) in more detail. Other networking issues, such as Internet and intranet connectivity and functions are also covered.

The last section before the appendix describes the enterprise components of Windows 2000. The appendix provides details on the different flavours of Windows 2000 and a useful chart of Windows upgrade paths.

This is an extremely useful and comprehensive book to have around, with enough detail and information to take the worry out of installing and maintaining Windows 2000.

Darren Ellis

Author Kathy Ivens and Kenton Gardiner
Publisher Osborne/McGraw-Hill
Contact McGraw-Hill Book Company Australia
Phone (02) 9415 9888
Price \$64.95
ISBN 0072119209
Rating ★★☆☆

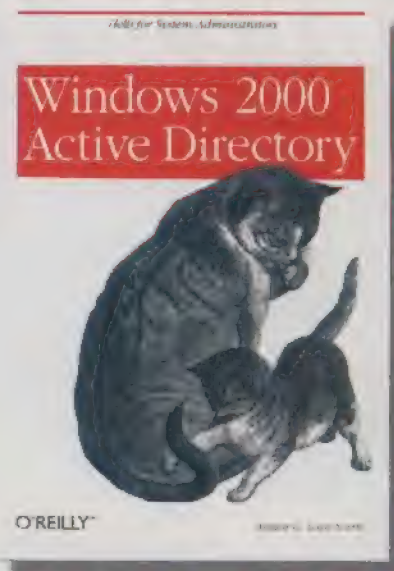
Windows 2000 Active Directory

Designed as an aid for experienced systems administrators, *Windows 2000 Active Directory* from O'Reilly is a comprehensive look at the inner workings of Microsoft's new Active Directory.

O'Reilly has produced some of the best technical references around and this latest title is very solid. After a brief introduction to the concepts surrounding Active Directory, the reader is thrown head first into schemata, namespaces and DDNS.

The book is split into three sections: the basics of Active Directory, design and implementation of an Active Directory structure, and the Active Directory Scripting Interface. Each chapter looks at a different aspect of the topics covered.

The coverage is very technical with plenty of scripting examples and flow diagrams provided to explain some of the brain-bending concepts inherent in



directory services. The author uses a mix of stories about the development of Windows 2000, precise technical detail, and well-thought-out examples.

This book is definitely for reference rather than training as it skips the lessons and quizzes commonly found in many other computing titles. The chapters on upgrading from NT 4.0 are well done and contain many helpful suggestions on preparing and migrating your existing NT 4.0 infrastructure.

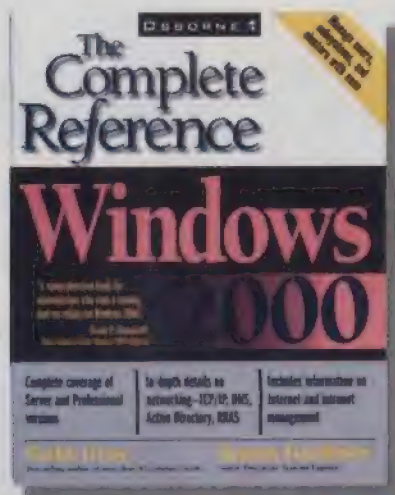
Microsoft and Novell certified professionals who find themselves looking down the barrel of an upgrade to Windows 2000 would do well to have this book handy when planning their Active Directory rollout. However, if you need a gentle introduction to Windows 2000 and Active Directory, you should look elsewhere.

Lachlan Botticchio

Author Alistair Lowe-Norris
Publisher O'Reilly
Contact Woodslane
Phone (02) 9970 5111
Price \$79.95
ISBN 91-56592-638-2
Rating ★★☆☆

Guide to ratings

- ★ Don't cross the street for it
- ★★ Might be fun on a rainy day
- ★★★ Fun in any weather
- ★★★★ Sleep out to buy it
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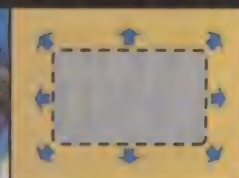
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If you can use a screwdriver, upgrading your PC's power supply unit is easy. By Daniel Rutter

Step by Step

The majority of PCs on the market contain fairly ordinary 235 watt Power Supply Units (PSUs). If you add power-hungry components to such a PC, it may exhibit all sorts of strange problems as the PSU struggles to give them the juice they need.

PSU wattage ratings are often misunderstood. A PSU's rated wattage indicates the 'highest' power output it can achieve — not the power it constantly delivers. Switching to a power supply with a higher wattage rating will not result in pyrotechnic cataclysm, destroying your computer.

Currently, power supplies have several outputs. Only three of them are subject to large loads: the 5V, 12V and 3.3V lines. Each output line has an individual current rating, which should be specified on the case of your PSU. If the total load on any one line cannot be met by its rated current, you'll need a higher rated PSU to adequately supply the device (or devices) on it, even if the other outputs are far from overloaded. For instance, a 235W PSU in a computer full of 12V fans may be overloaded even if it is delivering less than 200W in total.

Many 235W supplies start running out of puff a while before they're delivering their full rated power, especially if more than one output is approaching its limit. As the load reaches and passes the PSU's real capacity, the output voltage falls away. If the voltage sags aren't too severe or your hardware handles them well, you may not experience any problems. Otherwise you could get lots of annoying crashes. PSU-related problems can take many forms, because unreliable power can interfere with any component in your computer.

Changing your PSU is a very easy procedure which can be carried out by anyone who can use a screwdriver. It's difficult for you to electrocute yourself switching PSUs because all of the live wires are safely tucked away inside the PSU's case. As long as your PSU doesn't have a disastrous wiring fault, and you avoid doing anything silly like fishing around inside your PSU with a knife, you should manage to avoid a trip to the emergency room.

Theoretically, it's very easy to damage your computer while you're working on it

because some of its components are so sensitive that they can be destroyed by minute static charges generated by your body and passed on by your hands. In practice, this rarely happens, and you are unlikely to encounter such problems swapping a PSU.

You can only swap your PSU for a higher rated unit if there one is available for your computer. If it is a relatively new clone with an industry-standard box then you should be able to find one, but if it's a machine with a special PSU, you could be in trouble. Brand new, a good quality 300W ATX PSU won't cost you much more than \$100. A PSU for an older model will probably cost more, because there is much less demand for them these days.



A plain 235W ATX PSU can be seen in the foreground of the picture above. The big lump in the background is an ancient 150W XT PSU. If you have a later model computer, it will have an ATX PSU or more likely, an LPX (PS/2) PSU. LPX and ATX PSUs are the same size and shape, but they have different motherboard connectors. Older systems may have AT/Desktop, AT/Tower, Baby AT or even XT PSUs, all of which are different shapes and sizes. New microATX systems have another PSU type again, but their small 145W supplies are usually adequate, because microATX machines can't be expanded much.

Once you have a replacement PSU, the swap job should be very simple.

Open your computer and disconnect every cable that connects to the PSU (fans, drives and so on). The Molex-type plugs that connect to your hard disk and CD-ROM drive may be difficult to remove. Don't yank them too hard or you could damage the socket; wiggle them gently for a while and they should come free.

Floppy drive and motherboard power connectors are easy to remove and refit. Pre-ATX systems have a two-piece motherboard power connector that *must* be fitted such that the black wires on each are orientated towards the centre of the pin block. Look at the way that they are fitted to your current PSU and replicate this on the new one. ATX systems have a simple one-piece connector that clips in place, and can only be orientated one way.

Once your cables are disconnected, you can remove the four case screws that hold the PSU in place, slide it out, and replace it with the new one. Often, the PSU isn't anchored to the case by anything other than the screws, so take care as you remove them that the PSU doesn't drop off onto anything. Once you have screwed the new PSU in, reconnect all of the power plugs, close your case, and you're done. The power is in your hands.

Daniel Rutter can be contacted at dan@dansdata.com. For a complete archive of APC Step by Step columns, see <http://apcmag.com/step/>.

Windows

Customise your Windows 2000 interface and learn the secrets of FTP serving under Windows 98.

If you've just installed Windows 2000, it will probably take you some time to get used to the new interface, and the tweaks and features that have been introduced. Once you're comfortable, though, you will probably want to customise your working environment. While many features of Windows 2000 are carried over from previous versions, there are also some useful new options.

The simple tips

The Active Desktop remains a feature of this new OS, with some nice additional tweaks and added stability. With it, you can potentially build any interface your heart desires.

Most of the basic visual options are contained in the Display Properties dialog, found in the Control Panel under Display, or can be accessed by simply clicking on an unused section of the desktop and selecting Properties. Most are self-explanatory.

The first tab sets the background properties of the desktop. It allows you to place either HTML files or images as the background. For those familiar with this feature from Windows 98, it has changed slightly in 2000, and is now more like a front end to the Active Desktop function. Selecting HTML or even a JPG as a file type automatically turns on the Active Desktop. A side effect of this can be that your desktop icons disappear. Don't panic — this is a normal function. You can make them reappear by right-clicking on the desktop, selecting Active Desktop and then Show Desktop Icons. We'll deal more with the Active Desktop in a moment.

The second tab from the left is the Screen Saver tab, which allows you to select from a variety of screensavers in the drop-down list. You can also set the period of inactivity before switching to screen-saver by changing the values in the Wait box, and configuring details of the particular saver you have selected by clicking on Settings. Checking the Password Protect box will mean that a login is required to

exit the screensaver after it has activated and return to Windows.

The Appearance tab lets you specify the colour and font details of particular elements of your interface. You can either select a Scheme from the drop-down list, or create your own by selecting individual items from the Item list and changing their settings. For instance, selecting Active Title Bar in the item list gives you the option for the font and font size/colour in the title bar of the active windows, as well as two colour options: if different colours are selected in the latter, the title bar will be gradated with those colours at either end.

For users who are fond of very high resolutions, it's a good idea to manually change some of these settings. Enlarge the fonts so text can still be read at high resolutions, and change the size of the icons to match the resolution.

The Effects tab allows you to toggle between some fairly minor interface points. It allows you to change the graphic for your main desktop icons, toggle between menus that fade in or slide in, and several other minor tweaks.

The last tab is the Settings tab, which allows you to set the resolution and colour depth. The setting you choose will depend on the capabilities of the graphics card you use, your monitor and your personal preference. We do, however, recommend

increasing the refresh rate to the maximum your hardware can handle, for purely ergonomic reasons. It isn't immediately obvious how you do this. Click on the Advanced button, then select the Adapter tab in the newly opened window. There will be a List All Modes button, from which you can select the best resolution/refresh rate. The Monitor tab may also have a list of refresh rates from which you can select. If your screen goes black at any time during this process, don't panic — if Windows doesn't receive confirmation that the new screen resolution is working, it will revert back in 15 seconds.

The Active Desktop

Fortunately, the Active Desktop is a lot more stable in this version of Windows — and somewhat more flexible.

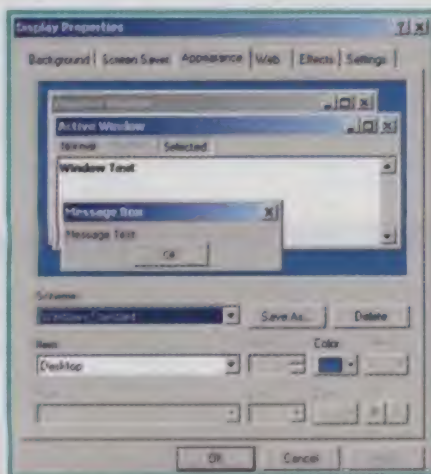
First, turn the Active Desktop on. Do this by either right-clicking on the desktop, selecting Active Desktop → Show Web Content, or by selecting the Web tab in the Display Properties dialog and checking the box next to 'Show Web content on my Active Desktop'. Now you're ready to add items to the desktop.

To add potential desktop objects, you need to be in the Web tab of the Display Properties dialog. The only object installed by default is your Internet Explorer home page.

To make an object appear/not appear when Active Desktop is turned on, you need to select or deselect the item in the list. If selected, it will appear where it was last placed. Objects can also be added and removed from the Desktop by right-clicking on it, selecting Active Desktop and then toggling the objects that appear at the bottom of the menu.

To add a new desktop object, click the New button. Windows will ask you for the URL or file to be embedded in the Desktop. If you select either a remote or local image file, then adding it simply involves finding the file on your hard disk.

It's a little trickier when you select a remote HTML file as your desktop. Here



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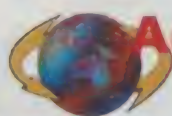
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you have a number of options as to how to deal with the page. In the Web tab, select the remote Web page you have added and click on Properties. A new dialog will appear, the first page of which will have an option 'Make this page available offline'.

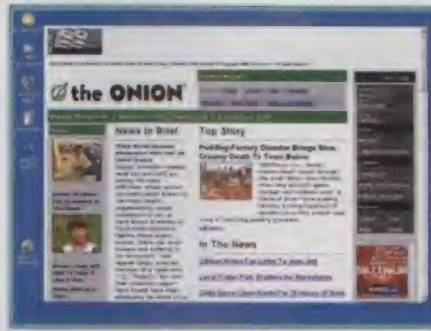
Unless you have a permanent connection to the Web, you should leave this checked — otherwise Windows will try and reload the page every time you log on. The second tab allows you to set a Synchronisation schedule for the Web page, so it can be updated (and your desktop with it) on a regular basis. By default, it is set to only reload the page when you manually synchronise by selecting Start → Programs → Accessories → Synchronize, then click Synchronize.

The third tab in the Properties Window sets Windows to also follow links from that Web page and download the linked pages for offline viewing, so you can click on items from the Desktop page while offline. Its default setting is 0 (so no pages linked to the main page are cached), but you can set the number of links followed to up to three pages deep.

Now you have a bunch of images and a couple of Web pages plastered on your desktop. To arrange them, simply scroll the mouse over them. If you hold the mouse for a moment near the top or border of the object, an outline will appear. If you grab one of the sides or corners of the object you can resize it like a normal window (images will stretch).

Grabbing the bar at the top allows you to move the entire thing. The top bar also has a button for maximising and closing the object: the former makes it take the whole screen, and the latter will make it disappear (which results in it being deselected in the Web tab of the Display Properties).

Once you have everything the way you want it, right-click on the desktop, select Active Desktop → Lock Desktop Items. This will prevent the main bar and border



from popping up constantly as you scroll your mouse over objects on the desktop. If you want to be able to move objects again, simply repeat the action.

Windows 2000 also allows you to remove those pesky desktop icons, such as My Computer and the Recycle Bin — although it is recommended that you drag the latter to the quick-launch part of the Taskbar (usually located next to the Start button) before you do so. To toggle the icons, right-click on the desktop and select Active Desktop → Show Desktop Items. This option is only available if the Active Desktop is turned on. If you want to move your desktop items quickly to the Taskbar, simply right-click on Taskbar, select Toolbars → Desktop. The same mechanism can be used to quickly add URL links, folders and the IE address bar to the Taskbar — if you have enough room.

There are a few issues to consider. First, a cluttered desktop usually ends up being more annoying than useful. Subtlety is the name of the game when it comes to the Active Desktop. The Desktop, you'll soon realise, is not a good place for browsing. You have the right-click menus and hotkeys to move around with, but none of the other user-friendly browsing features. Likewise, scrollbars on your desktop are another annoyance. In the end, you'll find that few Web pages — other than those you make yourself — are of much use on the Active Desktop.

Finally, it's also quite possible to have some JavaScript or even ActiveX controls embedded in a HTML page that is on the

desktop. Given the general lack of stability of these objects, it isn't recommended.

That said, by creating HTML files with links to local files and executables, it's quite possible to create some startling new interfaces with the Active Desktop. Potentially, you could do away with the Windows interface completely, and replace it with a wholly custom interface which can look like . . . well, anything. Applications will still appear normally when run.

Audio

As with past versions of Windows, it is also possible to customise the sound scheme. Go to the Control Panel and select 'Sounds and Multimedia'. It is then quite simple to apply sounds to events. Select the event in the top part of the box, then choose or locate the sound under the Name drop-down box. You can save your sound scheme for later use.

Themes

It is possible to save your entire desktop and audio settings as a .theme file, which you can share with others to instantly get the same setup. Run Themes from C:\WINNT\SYSTEM32\THEMES.EXE. Click Save As, and give your current settings a name. This will create a file, which, when double-clicked or opened using Themes can completely change the visual configuration of Windows.

Wanna know more?



These Windows 2000 tips are taken from *The Windows 2000 Pocketbook*, your complete resource for getting the most out of Windows 2000. Pick it up from your local newsagency for \$14.95, or order online at apcmag.com/shop.



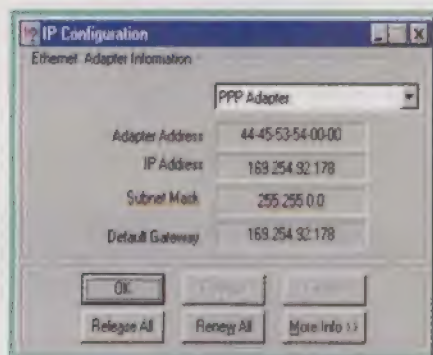
Windows 98 as an FTP server

Understanding FTP and Web servers is important if you want to develop a greater understanding of the technology that is carrying us through the information age.

Every time you download a file or access a Web page, you rely on the services of an application running on a remote machine called a *server*. The term 'server' refers to both the actual machine as well as the software application that runs on it. The processes that occur between your system (the client) and the server are often complicated, but usually take only a few seconds to perform.

Windows 98 is not the ideal operating system to host a server of any kind. It can't match the stability or security of a Unix or Windows NT box. However, it's adequate for the purposes of hosting simple Web content and providing FTP services to a trusted circle of friends or colleagues. It's also great for experimenting with server applications and improving your understanding of how they work.

There are many reasons why you might want to convert your Windows 98



machine into an FTP server. Although many people host illegal MP3 FTP sites, there are also many legitimate uses for an FTP server. University students and workers connected to an intranet may use an FTP server for work-related purposes. An FTP site lets users upload data as well as download it, so an FTP server is an ideal way for people to share their work.

It is much easier and more effective to set up an FTP server (or Web server for that matter) on a system that is permanently connected to the Internet or at least has a static IP address. An IP address is a four-part number that makes your computer identifiable to other computers on a TCP/IP network such as the Internet. If you have a static IP address, you can assign your FTP server a perma-

nent address. This will save you reconfiguring it and constantly notifying people of the new address each time it changes. If you don't notify your intended users of the new IP address, they won't be able to find your FTP server, even if it is online. Most IP addresses are assigned dynamically by your ISP when you dial in to the service. Ask your ISP about getting a permanent Internet connection or a static IP address.

Windows 98 doesn't come with its own native FTP service software, so you will need to install a third-party FTP server application on your system. How you set up your FTP server depends on the application you choose. When setting up an FTP server there are general procedures to follow, regardless of the server application you use.

The first step in setting up an FTP server is the creation of individual user profiles. This involves assigning usernames, passwords and privileges to everyone who will have access to the server. The privileges specify which files, folders and actions a user can access. Setting up these accounts is probably the most tedious aspect of setting up an FTP server.

Before you go live, you will need to find out your system's IP address. You won't need to enter this number into any program settings, but if people want to access your server then their client software will need to know it to access your server. As mentioned previously, if you use a dialup account with server-assigned IP addresses (dynamic IP) then you will have to perform this task every time you start up the server. To find out your IP address, simply go to Run in the Start menu and type winipcfg.

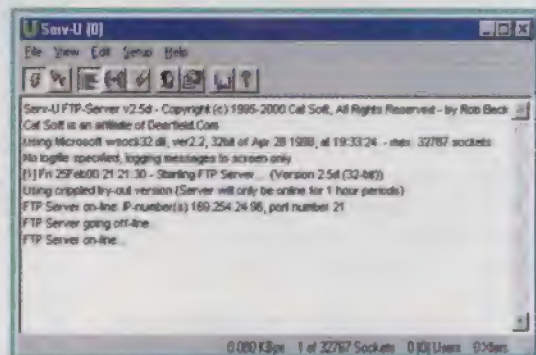
Most public FTP servers provide an anonymous account. This allows anyone to gain access to the server under the username 'anonymous' and provide their email address as a password. Since anyone can use this account to log in to your server, it is in your best interests to keep the privileges available to it to a minimum or remove the anonymous login account altogether.

Once the accounts are set up, you are almost ready to go.

Serv-U step by step

There is a plethora of third-party FTP server applications that you can use for Windows 98. One of the most user-friendly is Serv-U.

This column doesn't usually provide step-by-step procedures for operating specific applications, but in this case it's the best way to gain hands-on experience with an FTP server. The trial version of Serv-U (which can be found on this month's cover CD) can be installed under one of two licensing arrangements. The first means it connects to the Internet each



time it runs, to ensure that you have not exceeded your trial period. Under the second arrangement there is no check of whether you have exceeded your trial period, but it will only allow the server to run for an hour before it has to be restarted. The second option is preferable for experimenting with Serv-U.

When you load Serv-U, the main window appears, displaying details about the users logged in to the server. As this is the first time you will have used the server, not much will be displayed. Go to the Setup menu and select Users. Prepare yourself for the painstaking task of entering all the usernames, passwords and privileges.

For the time being, let's set up the anonymous account. Do this by setting the home directory (this is the location where users will be directed to download files). Next, add privileges for the anonymous account in the File/Directory Access Rules area. You also have to Add a path here that points to the home directory; something like c:\ftp is good. Click on Store to save these settings.

Before assigning privileges to individual users and placing your FTP server online, you should check that everything works correctly. If you wish to test your FTP server on your machine before going online, then be sure to remember that the local host IP address is always 127.0.0.1. Enter the local host IP into a Web browser or FTP client (if you're using a browser, make sure you enter the host IP in the format ftp://127.0.0.1/). If your FTP server is working correctly, you should be able to see all the content that you want to have available in the browser pane or file explorer of your FTP client.

As long as there were no problems logging in under the anonymous account, you can go ahead and create individual user accounts. You can save time by placing individual users who share common privileges into groups, and assigning privileges to those groups as a whole. Keep security in mind when you assign privileges to each user or group. Privileges under Serv-U include Read; Write; Append (which allows users to continue with uploads that have stalled and are incomplete); and Delete and Execute (which leaves your system open for remote users to run applications on your system). Now your server can go live on a LAN or the Internet.

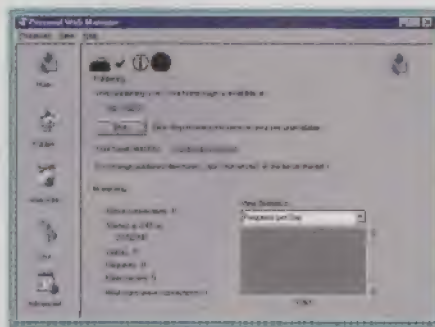
The Personal Web Server

This column has already covered Windows 98's Personal Web Server (PWS) (see APC July 1999, page 147), but it's worth revisiting because a Web server has certain advantages over FTP servers. For example, a personal Web server is the ideal way to provide information to colleagues over an intranet or the Internet, without storing it on a remote machine.

In addition to providing easy access to information, the HTML format helps overcome most compatibility problems

that arise when users try to access content from different operating systems, platforms and applications. Aside from the practical reasons, you may simply enjoy messing around with the technology.

The processes that occur between a Web browser and a Web server are similar to those that occur when retrieving a file from an FTP server. The browser is given a Web address, it communicates with a domain name server to translate the alphabetical domain name into an IP address and then creates a link to the Web



server at that IP address (see APC March, page 134 for a more detailed explanation of the domain name system). The browser then asks the server for the page that is

being requested by the user, downloads it and displays it. If you haven't registered a domain name and chosen a name server to associate it with an IP address, users will have to manually enter the numerical IP address for the site.

Windows 98's PWS is very easy to configure. It's on the Windows 98 installation CD, in the /addons/pws directory. After installing the PWS, store your Web site in the folder that the installation program creates. If you do not have any Web pages to store, the PWS will help you create a home page. From there you can mess around with the server's features and put it online. For remote users to access the Web server, ensure that the PWS is running and that they know your site's IP address.

PWS is easy to use, but it is fairly limited as a Web server. As you become a more proficient Webmaster, you may want to host more sophisticated content, which means investing in a third-party Web server with more features.

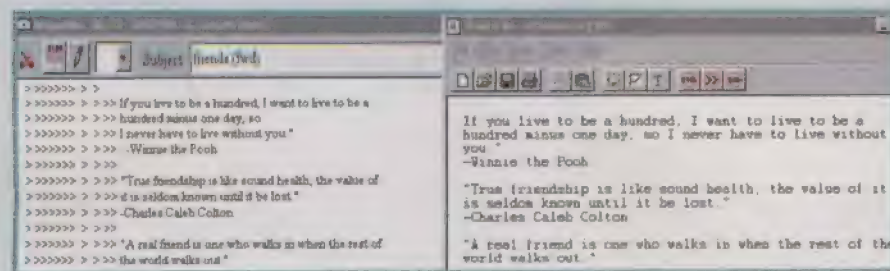
Kieran McNamee

Kieran McNamee can be contacted at kmcnamee@acptech.net. For a complete archive of APC Windows 98 columns, see <http://apcmag.com/win98/>.

Windows 98 shareware

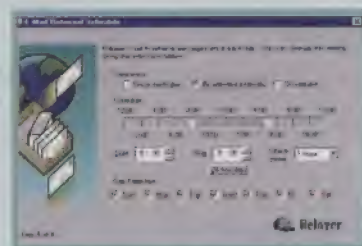
eCleaner 2.01

Easily decipher your messages, no matter how many quotation mark symbols and broken-up sentences there are.



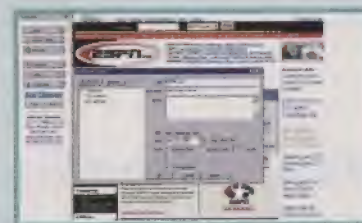
Relayer 3.1

Download and read your Web-based email in just the same way as you would from your regular POP3 mailbox.



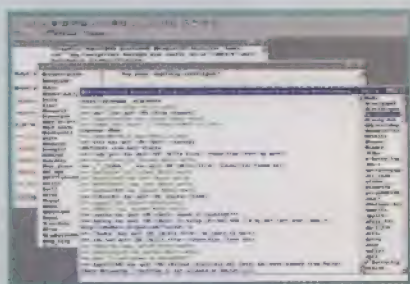
SurfSaver 2.0

Quickly save Web pages as you surf and manage them for offline viewing later.



mIRC 5.7

This update to the popular IRC client is a must in any collection of Internet shareware utilities.



DNTools 2.0

A handy tool if you connect to the Internet via modem. It manipulates your registry settings to speed up your connection.

All these packages can be found on this month's cover CD, along with more detailed reviews.

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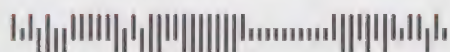


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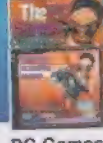
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Linux

Rsync is a tool for copying files. It is similar to rcp and scp (see APC April, page 138), but it has more options and some intelligent features that can greatly speed file transfer operations across slow links such as modem connections. rsync was developed by Andrew Tridgell, the primary author of Samba, the file/print server for Windows clients.

rsync is included with most Linux distributions. If it isn't pre-installed with yours or you want to download the latest version, visit the rsync Web site at <http://rsync.samba.org/>.

To use rsync, it must be installed on both the source and destination computers. There is no need to run an rsync server or modify your `/etc/inetd.conf` file to use it, because rsync can use rsh or ssh to transfer data between computers. Of course, this implies that you already have rsh or ssh up and running. If you have the choice, ssh is preferable to rsh because of its security features (see APC March, page 140 for more information on ssh).

The basic usage of rsync is similar to scp, as is the command syntax. You can see the basic command structure for copying a file from your local computer to a remote one below.

```
rsync localfile remotehost:remotefile
```

To reverse the copy direction, just swap the two parameters around.

rsync uses rsh by default to connect to the remote machine. To make rsync use ssh instead, you can supply the `-e` switch to specify how it should transport the data.

```
rsync -e ssh localfile remotehost: remotefile
```

If you always use ssh, then you can tell rsync to use it as the default transport by setting the `RSYNC_RSH` environment variable in your shell's start-up script to ssh.

The rsync algorithm

rsync's main advantage over similar tools such as rcp, scp, ftp or tar is that its copy operation is more sophisticated than a simple file transfer. If rsync finds older versions of the files it is copying on the destination computer, it finds which portions of the files have changed and transfers them selectively. Since rsync works on file differences,

it performs very well when there are large files that have small but frequent changes made to them, such as database files.

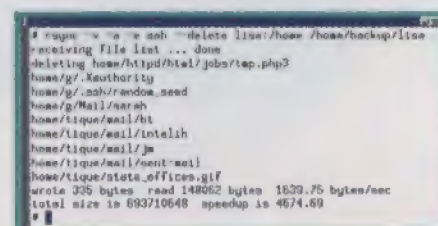
Andrew Tridgell's PhD thesis, *Algorithms for Sorting and Synchronization* (available at <http://rsync.samba.org/> under Documentation), explains that rsync's advanced capabilities are a quality of the rsync algorithm. The paper discusses how rsync "... is used by several large companies (including Nokia and Ford) to synchronize multigigabyte engineering databases over slow network links".

Copying directory trees

To copy a directory tree (rather than individual files) with rsync, you can use the `-r` (or `--recursive`) switch just as you would with rcp and scp. Alternatively, use the `-a` (or `--archive`) switch which will also copy the modification times, permissions, soft links and devices. The rsync command below will copy everything from `/home` to the remote host's `/backup/home` directory.

```
rsync -a /home/remotehost:/backup/ home/
```

This type of command is handy for performing backups between machines. rsync really shines when doing backups over a



slow link, but it's still very useful over a LAN. For example, you could set aside one machine on a local network as a backup server and create a cron job that runs nightly, connecting to each of the machines on the network and copying any files that need to be backed up regularly.

If you were going to use the above command to perform backups, you may also want to supply the `--delete` switch. This switch deletes files in the destination directory that no longer exist in the source directory. This sounds like a dangerous option — and it can be if used incorrectly — but there is an optional `-n` or `--dry-run` switch that allows you to test an operation

rsync is a highly intelligent file copy utility for low-bandwidth connections. **By Geoffrey Bennett**

before you use the `--delete` switch. It tells rsync to show you what it would have done if you hadn't specified that option.

Sometimes you may not want to back up a particular file or directory that would otherwise be included. For example, if you are running a Web cache, you might not want to back up the `/var/spool/squid` or `/var/log/squid` directories, even if you were backing up the `/var` hierarchy. To do this you can use the `--exclude` switch.

```
rsync -a --exclude squid --delete proxy:/var/ /backup/var/
```

Although rsync was designed for network file operations, you can also use it to mirror files locally. For example, if you have a second hard disk that you want to use to back up your first disk, you could use rsync instead of tar or cp. rsync can use the size of a file and its modification time to determine whether a file has been changed, so its backup operations are faster and more efficient than utilities that back up each file byte by byte.

Another useful application of rsync is mirroring Web site files. It makes sense to have a production Web server that is seen by the public, and a test or development Web server where you can make changes without bringing the site down. When you're happy with your changes, use rsync to upload the new version of your site.

Verbose and quiet modes

To see what rsync is doing as it proceeds, you can use the `-v` (or `--verbose`) switch. rsync only prints warnings and errors by default; when told to be verbose it will also print the name of each file as it is being transferred and give you a summary at the end (see figure 1). The speed-up figure is calculated by comparing the size of the original files with the number of bytes that are actually transmitted.

When transferring large files, you can use the `--progress` switch to tell rsync to give you regular updates on how much of each file has been moved or copied. However, if you want less output from rsync (for example, if you are running rsync from cron) then the `-q` (or `--quiet`) flag is appropriate.

When transferring a file, rsync won't replace the old file with the new version until it has downloaded all the information

it needs to generate the new file. If you abort an rsync transfer (for example, by pressing Ctrl-C), rsync will, by default, leave the file it was working on in its original state and discard any progress made on that file.

This is often a good thing. If you were uploading a new version of a Web site, you would want the old version or the new version of each file to be available — displaying the old version of an HTML file is better than displaying half a new one. However, you may want to retain the partially transferred file. For instance, if you were transferring a new IOM file over a modem link and the connection dropped out, then having rsync keep the portion it had already received could save you a lot of time. This requires the `--partial` switch.

Replacing mirror with rsync

Mirroring FTP sites is usually done using a Perl script called *mirror*, but rsync is beginning to replace mirror as the tool of choice. So far we've only mentioned using rsh and ssh as optional transport modes for rsync's data, but rsync also incorporates its own server. In a similar manner to FTP, you can set up both anonymous and authenticated access to data through this server.

A popular FTP site that permits anonymous rsync access in addition to its regular service is `ftp.aarnet.edu.au`, an Australian mirror of overseas archives. We'll use this server in our examples (visit <http://ftp.aarnet.edu.au/> for more information).

The data available on an rsync server is divided into *modules*, which can be thought of as top-level directories. To specify to rsync that you want to connect to an rsync server, use a double colon (`::`) instead of a single colon (eg. `remote-host::module/directory`).

To see what modules are available on a rsync server (if the server's maintainer supplies them there will be short descriptions as well), simply omit specifying a module name or a destination path name:

```
rsync ftp.aarnet.edu.au::
```

To see what files are available in a particular module, use the `-r` switch, specifying the module name (again, leave off the destination path name).

```
rsync -r ftp.aarnet.edu.au::redhat
```

You will probably want to redirect the output to a file or to a command like `less`, as the file listings for an entire module are usually very long.

Once you know the path name to the directory you want to download or mirror, you can command rsync, as mentioned previously.

```
rsync -v -a --delete --partial --progress  
ftp.aarnet.edu.au::redhat/.../i386  
/home/redhat-updates/
```

Setting up an rsync server

To set up an rsync server, you need to create an `/etc/rsyncd.conf` file to describe what directories you want to make available. You will also need to start the server somehow.

The server can be started in the background from one of your system start-up scripts with the command `rsync --daemon` (`/etc/rc.d/rc.local` would be a good place for this). It is also possible to set up the server so that it only starts when there's an incoming connection, through `inetd`; this method is described in detail in the `rsyncd.conf(5)` manual page.

The `rsyncd.conf` file format is quite simple. The example below serves `/home/ftp/pub` to incoming rsync clients as the default ftp module. It also limits the maximum number of concurrent connections to 10.

```
max connections=10  
[ftp]  
comment=Public FTP directory  
path=/home/ftp/pub
```

As mentioned before, the rsync server supports authenticated access as well as anonymous access. Below is an example of a module that uses authenticated access in addition to allowing uploads (modules are read only, by default).

```
[incoming]  
comment=Private upload area  
path=/var/tmp/rsync-uploads  
read only=no  
auth users=geoffrey  
secrets file=/etc/rsyncd.secrets
```

You will also need to create an `/etc/rsyncd.secrets` file with one username per line (the usernames do not need to correspond with real usernames on the system):

```
geoffrey:mysecret
```

To permit uploads, you will also need to set the permissions on the upload directory correctly for whichever user the rsync server runs as (usually `nobody`).

Geoffrey Bennett can be contacted at geoffrey@netcraft.com.au. For a complete archive of APC Linux columns, see <http://apcmag.com/linux/>.

Linux freeware

Linzip

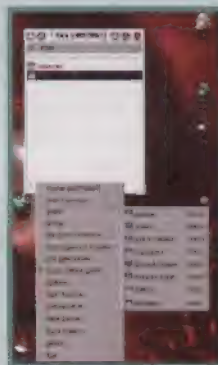
Linux's answer to WinZip, provides a familiar interface to manage, zip, arj, tgz, and lzh-compressed files.

Linuxconf

An extensible management tool for configuring Linux client and server functions, Linuxconf simplifies basic system administration tasks.

Acrobat Reader

This document viewing utility is associated with Adobe's Portable Document Format (PDF) files created in Adobe Acrobat



Licq for Linux

Licq

This full-featured Linux-based ICQ client allows you to register on, and chat using, the Mirabilis ICQ network.

kruiser

This KDE-based file manger acts in a similar way to Windows Explorer.

All these packages can be found on this month's cover CD, along with more detailed reviews.

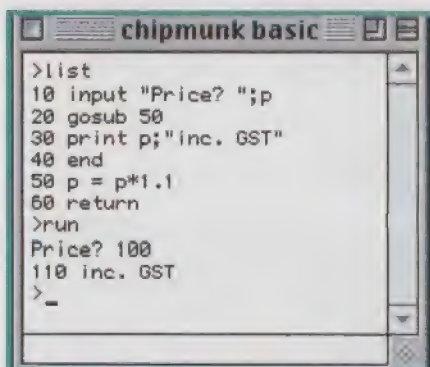
Learn to use your Mac more productively with this beginner's guide to Basic. By Stephen Withers

Mac OS

When personal computers were first released to the consumer market about 20 years ago, almost everyone who owned one had some experience programming in Basic. They would have tinkered with it a little, even if it only involved copying sample programs from APC. Most people's expertise didn't advance beyond the level of printing multiplication tables or drawing polygons, but for others Basic was a launch pad for a career in programming.

Although GUIs such as Mac OS and Windows have made computers accessible to many people, only a small proportion of them ever try programming. That's OK — you can live in a house without knowing how to build one. However, by mastering a few elementary programming skills, you can greatly enhance your PC's productivity.

Macintosh's standard system software doesn't include a programming language, but there are at least two capable freeware versions of Basic for Mac OS: Chipmunk Basic and Metal. There's also a commercial package called REALBasic. Both free implementations will allow you to create quick and dirty programs to explore programming. Chipmunk Basic is particularly handy for Macintosh users. You can access technologies such as text-to-speech and enhance standard user interface items such as menus and dialog boxes.



For some, scripting systems such as AppleScript or those built into applications such as Microsoft Word, provide a playground for writing code without the intellectual and economic overheads of dedicated programming languages. However, they can be quite cumbersome. C++

and Java are powerful, but people are often put off by their complexity. Basic was designed for beginners; its name is an acronym of Beginner's All-purpose Symbolic Instruction Code. When you look at the source code for a Basic program, you are more likely to 'feel' that you could master the language.

Rather than providing a comprehensive introduction to programming, this column outlines the elements of Basic. Some of the things covered may not apply to all versions of Basic, but there should be enough information to get you started.

For more detailed tutorials, check your public library, a Basic user group library or second-hand bookshop for titles on the subject. Any Basic manual printed since the '80s will be fine, especially books covering the classic Dartmouth Basic or the versions for the Apple II (Applesoft), TRS-80 or early MS-DOS machines (GW-Basic). These are especially relevant to the forms of the language that will be discussed here. Avoid books aimed at the Commodore (PET, Vic-20, C64) market as those machines required a special dialect of Basic.

All of the examples used in this column have been tested with Chipmunk Basic which can be downloaded from www.nicholson.com/rtn/basic. Or you could try them using Metal which is on this month's cover CD.

Values and variables

Basic knows about three kinds of values: integers (whole numbers), reals (numbers that may have a decimal fraction) and strings (collections of letters, digits, punctuation signs, and so on). For example, 5 is an integer, 3.142 is a real, and the word Macintosh is a string. Basic requires strings to be enclosed in quotation marks like this: "Macintosh" (using standard double-quotation marks).

Variables are used to store values, and there are three types of variable to accommodate each kind of value. Usually, variables are real by default. The programmer assigns each variable an



alphanumeric name. They should be kept reasonably short and start with a letter. If you want a variable to be contain a string, you should end it with a dollar sign (eg. name\$); if it is an integer, use a percentage sign (eg. count%). Some implementations of Basic have other ways of specifying a variable's type.

Hello world

Sample programs like the one below are part of a time-honoured tradition in elementary Basic programming books. Our example prints the words "Hello world" on the screen — it takes just one line:

```
10 print "Hello world"
```

Note that the line of code starts with a line number. This is compulsory in some dialects, and optional in others. Generally, the computer will execute the lines in numeric order, regardless of the order you type them in. The statement required to print something is, logically enough, print followed by a list of the values or variables that you want printed.

Items in the list should be separated by semicolons if you want them to be printed next to each other. If you want them to be separated by a space, use commas. If the list ends with a comma or a semicolon, the output from the next print statement will continue where the previous one finished, otherwise it will start on a new line.

Input

To get a value from the keyboard into a variable, you use the input statement.

The following program reads a numeric value from the keyboard and prints it to the screen.

```
10 input a
20 print a
```

If you try running this program, you will see a question mark and the program will wait for you to type in a value. The statement contains a phrase that tells you what the program is looking for.

```
10 input "Type a number: "; a
20 print a
```

It is possible to write a program that accepts multiple numeric inputs in one step by separating them with commas in the input statement. Usually, only one string input can be entered in a single step because everything on the line is taken to be part of the same string.

```
10 input "Two numbers: "; a, b
20 print "You typed "; a; b
```

Assignment

'Assignment' is the term used for the process of assigning a variable to a particular value. An assignment statement consists of a variable, an equals sign and a value. The value can either be a constant or an expression. An expression consists of constants and variables that are combined with operators such as + (addition), - (subtraction), * (multiplication) and / (division).

```
10 profit = revenue - expenses
```

Two strings can be joined together with a plus sign.

```
10 msg$ = "Hello " + "world"
```

Remarks

It's a good idea to include remarks in your programs to indicate what the different sections do, or to remind yourself about any tricky techniques you've used. Placing a rem statement at the start of a line tells the computer to ignore it, allowing you to use the line for personal notes.

```
10 rem My first program
20 print "Hello world"
```

Looping

Using a program to carry out a series of steps a certain number of times is called looping. There are two looping situations to consider: the first is when you know in advance how many times the process must be repeated; the second is where it must be repeated until a certain condition is met. In the second situation you should use a for statement. It assigns a starting value to a variable, performs some statements, then checks to see if the variable has reached the specified finishing value. If the value isn't reached, it changes the value of the variable (usually by one, but you can specify other increments) and repeats the program. The following program uses a for statement to print the nine times table.

```
10 for i = 1 to 12
20 print i; "x 9 = "; i * 9
30 next i
```

It is a good idea to indent the lines between the for/next statements. That helps you see where the loop begins and ends. The other kind of loop uses the while statement. This checks whether a condition is true. If it is, the body of the loop is executed, then the test is reiterated. The end of the loop is marked by the wend (a

contraction of while-end) statement. The test may check whether a variable is equal to a particular value — such a comparison resembles an assignment statement, so don't get confused — or the comparison may be that a variable is less than (<), greater than (>), less than or equal to (<=), greater than or equal to (>=), or not equal to (<>) another. It is a good idea to set the variable used in the condition to an appropriate value prior to the while statement to avoid unexpected results. The following example repeats the while loop until the user types in the word yes.

```
10 a$ = ""
20 while a$ <> "y"
30 input "Done (y/n)? "; a$
40 wend
```

Against the flow

So far, our examples have started at the beginning and worked through to the end, but that's not always what you need. Statements that change the order of execution are said to change the *flow of control*. In Basic, they are the if, goto and gosub statements — next month we will introduce them and discuss the programming techniques they are associated with.

Programming may seem alien at first, but it is simply a matter of thinking about a task or process as a series of steps that can be expressed in a computer language. Next month we will look at some of the specifics of Chipmunk Basic and METAL, and see how they allow you to create useful (or at least moderately interesting) programs on a Macintosh.

Stephen Withers can be contacted at swithers@ozemail.com.au. For a complete archive of APC Mac OS columns, see <http://apcmag.com/mac/>.

Mac OS shareware: Graphics packages

ShareDraw 2.0.2

ShareDraw is a vector drawings application that is much more powerful than AppleWorks, and it's cheap.

Cameraid 1.1.3

Cameraid has quickly developed a reputation as the digital camera download tool of choice.

Iconographer 1.1.1

A straightforward design and editing tool for the 32-bit icons with 8-bit masks that were introduced in Mac OS 8.5.

iView Multimedia 3.7.2

Some of the most sought-after functions for media cataloguing in an elegant, scriptable application.

Thumbnail Maker 1.1

Quickly and easily produce JPEG thumbnails of images.

Rainbow Painter 1.7

Rainbow Painter has a host of sophisticated painting and image manipulation functions.

All these packages can be found on this month's cover CD, along with more detailed reviews.

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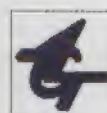
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Using your Psion for easy email and Web access. By Ronald Rosenbaum

PDAs

To use your Psion to access Internet services such as the Web and email, you'll need a modem or a mobile phone with a built-in modem and an IrDA-compatible port. Email and Web browsing applications are included in the software that comes with Psion 5 and 5mx systems.

Once you install the software, you need to tell the Psion what kind of modem you have and how to communicate to it, as well as your location, Internet settings and email account details.

Setting up your modem

To set up your modem, select the System button, then Control panel, Modems. If your modem type isn't listed, create a new one by tapping on the New button and entering a modem name and selecting the port type. If you're using the serial port, reduce the modem connection speed from 115.2Kbps to 57.6Kbps. If you have an infra-red modem or a mobile phone with an infra-red port, press the 'Connect using' button and choose infra-red as the type. This is all that's necessary to set up the modem, but you can increase your modem's speaker volume by selecting the Options tab and pressing 'Select desired volume level'. Sometimes you can diagnose and solve connection problems if you can hear the tones coming from the speaker.

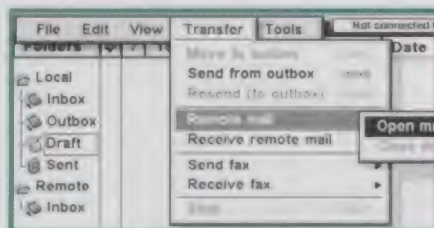
Configuring your location

The dialler requires you to configure at least one location. If you frequently travel to different states or countries, or use special dialler codes to place calls through an office PBX system, you may need to set up several locations. Select System, Control panel, and tap on the Dialling icon. You can edit the default location, Home, by pressing the Locations button and choosing the Edit menu. The country and area codes and country fields are self-explanatory; fill them in for your geographic location. Although it's not always necessary, the 'Dial out' tab sets various phone system codes. For example, your PBX system may require you to prefix phone numbers with a 0, 8 or 9 to place an external call. If you have a prepaid phonecard, choose the Charge-card tab to enter the details or go to the

Dial settings tab to choose from a list of general dialling options (eg. tone or pulse dialling, dial pausing and so on). Once you've finished, test the settings by entering a sample phone number in the main dialler screen. If required, you can configure additional locations by repeating the previous setup instructions and selecting Add rather than Edit under the Locations button.

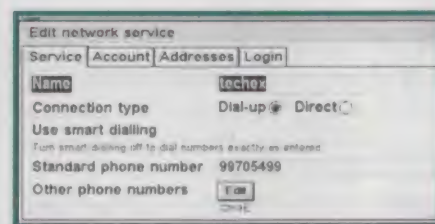
Configure your ISP and network settings

Now that the Psion knows how to dial and what device to dial from, you need to tell it about your ISP. First, select System then Control panel, and tap the Network icon. Push the New button to create an ISP profile. Select OK when the screen with 'Based upon generic settings' appears. Under the Service tab, enter the name of your ISP and its dialin number. Next, press the Account tab and enter your username and password. Most ISPs automatically assign IP address and DNS details and don't require any special login scripts. If your ISP requires any of these, enter them manually under the Addresses and Login tabs (contact your ISP for details). Now you're ready to dial into your ISP and use your Psion's Web application to surf the Net, but you still have a little more configuring to do if you want to use your Psion to get email.



Configure your email program

Run the email program by tapping on the Extras button and the Email icon. Enter your email account settings by pressing the Menu button and selecting Tools, Settings, Email. Enter your name, email address and SMTP server details on the Outgoing screen. Then select the Incoming tab and enter your POP3 server details,



Login (or mailbox ID) and password settings. Your Psion should be able to collect your email now.

The Psion email program is similar to your desktop PC email software, but it provides two mailbox views: local and remote. The local mailboxes contain messages that are stored on the Psion. The remote mailbox is only visible while the Psion is online; it provides a preview of the messages on your ISP's mail server. To read these messages you need to copy or move them to the Psion's local inbox.

Once you configure your network and email settings, you can physically connect your hardware to the Net. Plug in your modem or place your mobile phone within 2 to 3cm of your Psion's infra-red port. Whenever you try to send or receive mail, your Internet connection will be invoked automatically. To read mail you need to transfer messages from your remote mailbox to your local mailbox. To see what messages are waiting, press the Menu button, select Transfer, Remote mail, and Open mailbox or Shift-Ctrl-C to get a list of the messages waiting on the mail server. Double-tapping on messages will move or copy them to the local mailbox. Be careful, because moving or deleting a message removes it from the mail server and you won't be able to retrieve it via your desktop PC later.

To send an email, press the New button on the far right side of the screen and compose a new mail or fax message. Once created, you can tap on the Save-Outbox button to prepare it for sending. New messages can be written offline and sent in one hit when you connect. To send, press Ctrl-S, or press the Menu button and select Transfer, then 'Send from outbox'.

Ronald Rosenbaum can be contacted at ron@ats.au.com. For a complete archive of APC PDAs columns, see <http://apcmag.com/pdas/>.

OS/2's trapdoor is just the shot when you need a quick escape to Windows. **By Christopher Relf**

OS/2 Warp

Most OS/2 users also use another operating system. If you have Windows running parallel with OS/2, one of the biggest problems is switching between them to access the OS that will best handle the task at hand. This is a frustrating waste of time — it involves shutting down one system and rebooting the new system. It would be better if you could somehow freeze one OS, boot to another, and then revive the first when you're finished. With OS/2 you can — using a little-known function called the 'trapdoor'.

What does the trapdoor do?

The trapdoor (or 'hibernation') was incorporated into OS/2 when Warp 4 was released. It was designed to enhance control over how OS/2 boots and the way DOS-based applications execute, but you can also use it to switch between OS/2 and another operating system, quickly and easily.

When you drop through the trapdoor, OS/2 suspends all of its current operations and saves its current state (including a RAM image) to disk. This saves you having to restart your machine when you want to return to it, because it loads the memory image from your drive and picks up where it left off.

You need to create a full-screen OS/2 session object and point it to \OS2\SYSTEM\HYBERNAT.EXE. When you double-click on this object, OS/2 will attempt to hibernate and, if the operation is successful, it informs you that you can power down. Then you can reset your workstation and boot to another OS.

When you boot back to OS/2, it should resume its previous state in a matter of seconds.

You can also use the hibernate feature for its original purpose, making shutdowns and restarts faster; you should be able to send OS/2 into a suspended state and resume operations quickly, as long as your devices support this.

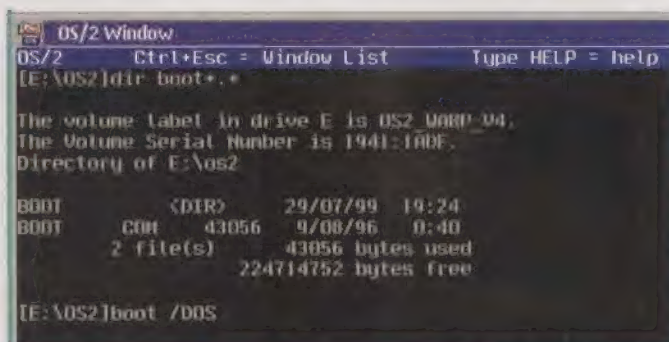
Windows compatibility

For many years it has been possible to dual boot OS/2 and DOS using an application called BOOT. To use this utility, DOS needs to be installed on the C: drive. BOOT was never intended to be used with DOS 7 (the version of DOS that Windows 95 sits on), but it will work because it honours the convention of DOS system files. BOOT needs to be able to find IO.SYS and MSDOS.SYS in the root directory of C:\, which still exist in DOS 7 (even though they are slightly more advanced).

Switching between the two operating systems is as simple as issuing the BOOT command with either a /DOS or /OS2 switch to select which one you want to start.

The trapdoor's pitfalls

Trapdoor can cause problems with file-name systems. As Windows 95/98 systems still use versions of the FAT file system,



OS/2 will need to be installed on a FAT partition for trapdoor and BOOT to work. VFAT is less compatible with OS/2 than HPFS, so you will encounter problems with things like extended attributes and file-name support if you use it.

Long filenames and directories that have been created using Windows 95's VFAT extensions appear truncated under OS/2's DOS support, and any files written to a FAT drive by OS/2 won't adhere to the VFAT convention. This has no effect on Windows in terms of file access. However, you should never use Windows or OS/2 disk doctoring tools on the drive as they will detect errors that don't actually exist and correct them; they will truncate all your OS/2 filenames to the eight by three format (FILENA~1.EXT). This can stop OS/2 applications working at all. You should carefully weigh up the pros and cons of using trapdoor.

Christopher Relf can be contacted at christopher.relf@mbox.com.au. For a complete archive of APC OS/2 columns, see <http://apcmag.com/os2/>.

OS/2 shareware: Encryption tools

*Z*Crypt 0.3

It's fast, small, secure and simple.

MandelSteg 1.0

MandelSteg uses steganography — a technique of hiding text in an image file.

PGP Easy Rider 1.3.0

A graphical user interface for PGP, which makes even difficult functions less painful.

PGP for OS/2

The ever-popular (and secure) command line encryption utility.

Blow-Rapid Application Use 1.0 GA

Blow-RAU is a particularly simple graphical user interface to Blowfish for OS/2 1.6x.

Blowfish for OS/2 1.62

A fast command line interface to the Blowfish encryption algorithm, developed by Bruce Schneier.

All these packages can be found on this month's cover CD, along with more detailed reviews.



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The string class can easily manage strings to help you avoid errors when developing applications. By Michael Smith

Simple C++

Dedicated readers of this column will recall our adventures with C-style strings and arrays, between June and December last year. As you develop your programming skills, it's good to know how things work at a low level. However, when it comes to developing applications, the complexity of string handling is a major source of errors. What you need is something to hide all of that complexity and give you an easy way to manage strings. Sounds like a job for a class.

It may not surprise you to learn that the designers of the C++ standard library had similar thoughts and created the string class (see 'Strings and characters', this page).

Listing 1 is a simple application that uses a string object. The string object may be initialised using an assignment, like object s1 in listing 1, or using the object's constructor, like object s2. You can join two strings together simply by using the + operator. This is already much simpler than using C-style strings.

Listing 2 shows more ways to initialise a string object. The s1 object is initialised predictably with a character array, pointed to by the pointer p, while s2 is initialised from another string object, using the copy constructor (see *APC* January, page 132). s3 is initialised with five 'X's, s4 with the first two characters from p (ie. ab). s5 is initialised with a substring from the array pointed to by p. The substring starts at position four and has length of two. s6 is initialised using a similar technique, except that the substring is taken from a string object.

The output from running listing 2 is shown in figure 1.

Smooth operators

The + operator can be used to link strings, as demonstrated in listing 1. Similarly,

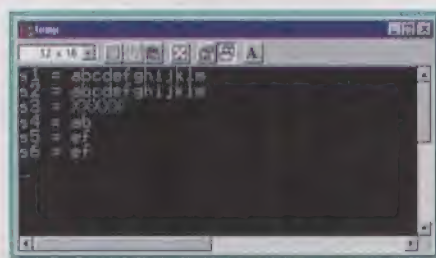


Figure 1

the += operator will append one string to another. The comparison operators, ==, !=, >, <, >= and <= can be used to do case-sensitive comparisons between two strings or between a string and a C-style string. The string class also allows you to access individual characters using the [] operator, so most normal array operations work with strings.

Direct access

The string class provides two member functions to give you direct access to the character data. The c_str() function returns a pointer to a C-style string that may be passed to functions that expect a char* pointer. Listing 3 shows an example of this. The data() member function returns a pointer to an array of characters. However, unlike the c_str() array, this array is not terminated by a null ('\0') character, so it cannot be used with C-style string functions. This can be useful for dealing with legacy code, but it's generally better to use functions specifically designed for string objects where possible.

Insertion 'n' stuff

The string class provides a collection of functions to assign or append characters to a string, but it's usually much simpler to use the = or += operators to do that. The insert() functions are a little more useful. Listing 4 shows an example of how to insert charac-

Strings and characters

In the more recent versions of C++, string is not really a class. The old string class has been replaced by the basic_string template. The basic_string template can handle strings of ordinary characters and 'wide characters'. Ordinary character type (char) is fine for handling American English, and languages with similar alphabets, but it is painfully inadequate for working with languages such as Russian, Japanese and Greek. In an effort to internationalise C++, its designers have come up with the concept of a *wide character* (wchar_t). This character type is capable of representing all of the various alphabets and characters used throughout the world. In Australia, most software development still uses the old character type, which we will concentrate on in this column. However, it's good to understand how to develop software in languages other than English.

For simplicity, the C++ library defines string as equivalent to basic_string<char> and wstring as equivalent to basic_string<wchar_t>.

So, technically, string is no longer a class, but an instance of a template. However, as it behaves exactly like a class, it's simpler to continue thinking of it as one.

ters into a string. You insert a string into s1 and a character array into s2. You insert the same character into s3 three times.

Listing 4 demonstrates two other functions: length(), and resize(). The length() function returns the current length of the string object. There is also an identical function called size(). Why have two func-

C++ source code

Listing 1

```
#include <iostream>
#include <string>

using namespace std;

int main()
{
    string s1="Hello ";
    string s2( "World" );
    string s3;

    s3 = s1 + s2 + "\n";

    cout << s3;
    return 0;
}
```

Listing 2

```
#include <iostream>
#include <string>

using namespace std;

int main()
{
    char *p = "abcdefghijklm";
    string s1( p );
    string s2( s1 );
    string s3( 5, 'X' );
    string s4( p, 2 );
    string s5( p, 4, 2 );
    string s6( s1, 4, 2 );

    cout<<"s1 = "<<s1<<'\\n';
    cout<<"s2 = "<<s2<<'\\n';
    cout<<"s3 = "<<s3<<'\\n';
    cout<<"s4 = "<<s4<<'\\n';
    cout<<"s5 = "<<s5<<'\\n';
}
```

```
cout<<"s6 = "<<s6<<'\\n';

return 0;
}
```

Listing 3

```
#include <iostream>
#include <string>

using namespace std;

int main()
{
    char *p = "Hello";
    string s( "hello" );

    if(0==strcmp(p,s.c_str()))
        cout << "Equal\\n";
    else
        cout << "Different\\n";

    return 0;
}
```

Listing 4

```
#include <iostream>
#include <string>

using namespace std;

int main()
{
    string s1( "abcdefghij" );
    string s2( s1 );
    string s3( s1 );
    string s4( "123" );
    string s5( "123" );

    s1.insert( 5, s4 );
}
```

```
s2.insert( 5, "123" );
s3.insert( 5, 3, '1' );
s4.resize( 10 );
s5.resize( s4.length(),
           'X' );
}
```

```
cout << s1 << "\\n";
cout << s2 << "\\n";
cout << s3 << "\\n";
cout << s4 << "\\n";
cout << s5 << "\\n";
}
```

```
return 0;
}
```

Listing 5

```
#include <iostream>
#include <string>

using namespace std;

int main()
{
    string s =
        "there was movement "
        "at the station";
    int pos1, pos2, pos3;

    pos1 = s.find("the");
    pos2 = s.rfind("the");
    pos3 =
        s.find_first_of("aeiou");

    return 0;
}
```

These listings can be found on this month's cover CD.

tions that perform exactly the same task? Don't forget that C++ was designed by a committee. As you might have guessed, the `resize()` function changes the length of a string object. If the object is too long, it will be truncated. If it's too short, it will be padded. You can specify which character to use for the padding, as was done for `s5` in listing 4. If you don't specify, as with `s4`, the object is padded with blanks.

Seek and you shall find

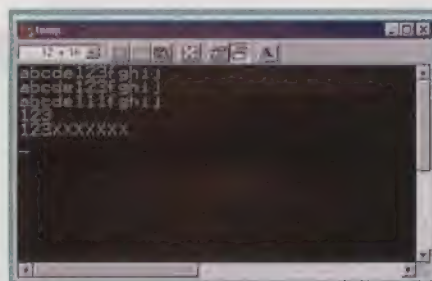
The string class contains a powerful collection of methods to find strings and characters within a string object. `find()`

locates the first occurrence of a substring within a string object, and `rfind()` finds the last occurrence. `find_first_of()` finds the first occurrence of any character within the substring. So in listing 5, the call to

`s.find_first_of("aeiou")` will locate the first vowel within the object `s`. `find_last_of()`, `find_first_not_of()` and `find_last_not_of()` all behave as their names suggest.

Well, time and space (our perpetual nemeses) have again beaten us. There are still a few more secrets to the string class, but they will be saved for another day. Next month's column will look at some of the C++ container classes. Until then, keep on coding.

Michael Smith can be contacted at emmenjay@zip.com.au. For a complete archive of APC Simple C++ columns, see <http://apcmag.com/simplec/>.



Enhance your applets with the addition of menus. By David Williams

Java

Recently, this column has explored Java's graphics primitives. Last month, you were shown how to use them to create a simple freehand sketching applet that allowed you to draw shapes in an applet window. Using the sketching applet as an example, this month you will learn how to enhance your applets with two new graphics components: `java.awt.Menu` and `java.awt.PopupMenu`.

To improve your sketching applet you need it to allow the user to draw in different colours. Java has a `java.awt.Color` class which has constants to represent specific colours. You can use these constants — or a variable of type `java.awt.Color` — to set your pen's colour. When you draw a line in the `mouseDragged` event handler, you can call the method `setColor` of the graphics object. This will specify the colour that the graphics object will use for sketching lines and shapes until you specify a new colour.

Now you need to choose some way to let the user change the colour interactively. You could provide a prompt that allows the user to choose a colour, or supply a text box that allows them to specify one. However, the most natural and intuitive method is to use a menu, better still a pop-up menu, which maximises the space available to the sketching pane.

The two menu components which are new to Java are `java.awt.Menu` and `java.awt.PopupMenu`. As you might expect, the `Menu` component defines a list of selectable options. The `PopupMenu` component creates menus that pop up on some trigger — usually a right-click from the mouse.

Both `Menu`s and `PopupMenu`s can hold `MenuItem` objects. Writing a `MenuItem` involves supplying it with a caption and then defining an action listener for it in the same way that you would define action listeners for buttons (see APC October 1999, page 174). When the menu item is clicked, Java turns to the `actionPerformed` method in the registered action listener to process the event. Like buttons, you can use any class at all to be the `MenuItem`'s listener and handle your action events. The class need only implement `ActionListener` and define an `actionPerformed` method. In this case, you won't write a second class, you will simply use the same class that you created to draw

the menu to handle the menu click. Hence your scribble class displays the menu and responds to any events generated by it. To do this, you need to specify your action listener as this, which is a special Java keyword for referring to the calling class itself. In large projects, it may be beneficial to use a different class for the action listener to separate the user interface from the business logic.

Your individual menu items must be added to a menu or a pop-up menu before they can actually be displayed and utilised. Similarly, a `Menu` object is a list of menu items that is not visible by default. A `Menu` object must be added to a `PopupMenu` object or a `MenuBar` object. The `MenuBar` object is self-explanatory; it creates a menu that appears at the top of your form, such as in Microsoft Word or your Web browser. We will show you how to make a `MenuBar` object another time. For the moment, it's sufficient to say that a `MenuBar` object exists.

If added to a pop-up menu, a menu behaves like a submenu. If you click your mouse on it, it spawns a secondary menu composed of additional menu items. You need to show the pop-up menu when the appropriate trigger occurs (such as a right mouse-click). This is achieved by defining a `processMouseEvent` method and waiting until a pop-up trigger event occurs. When it does, you can call the `show` method of your pop-up menu to display it at the appropriate x and y coordinates.

Let's recap. Firstly, a menu is ultimately a collection of individual items. Each of these items is a `MenuItem` object, and each has its own caption and action listener. By itself, a `MenuItem` object has no way of being displayed to the user. It must be added to a `Menu` or `PopupMenu` object. Menus themselves can be added to pop-up menus or to other `Menu`s; this creates the effect of a cascading set of submenus.

The `PopupMenu` object must pop up by definition, so it's not visible to the user

at the start of the program or most of the time during its execution. It does not pop up automatically; the user must trigger the pop-up menu in a system-specific way. As soon as the user does this, Java fires a pop-up trigger event. It is up to the program to catch and respond to the pop-up trigger. This involves rendering the pop-up menu visible by calling its `show` method.

Once the pop-up menu is visible, the user can select any one of the individual `MenuItem`s objects it displays, possibly traversing some submenus along the way. When a menu item is clicked, Java fires an `actionPerformed` event to the registered action listener for that `MenuItem` object.

To enhance your scribbler, make a pop-up menu that has menu items corresponding to four different colours. When one of these is clicked, you set an internal `Color` variable appropriately. Whenever your scribble applet draws a line, it now draws it in the colour you've specified through a call to the underlying graphic object's `setColor` method.

Run the modified scribble program in your Web browser or through the applet viewer and see if you can understand what's happening. Compare this month's code with last month's (see APC April, page 151) and you should be able to tell what's been added and why. You might need to refer back to our discussions of buttons to get a strong handle on the action listener and action performed elements, but if you've been following each month you should know precisely what's happening.

Have you been writing your own applets as you progress through the series? If you have, you might be able to remember situations where a pop-up menu would have been useful.

David Williams can be contacted at dave@qed.newcastle.edu.au. For a complete archive of APC Java columns, see <http://apcmag.com/java/>.



Java source code

Listing 1: scribble.java

```
import java.applet.*;
import java.awt.*;
import java.awt.event.*;

public class scribble extends Applet
{
    implements MouseListener,
    MouseMotionListener, ActionListener

    private int prevX, prevY;

    PopupMenu popup;
    Color col = Color.black;

    public void init ()
    {
        prevX = prevY = 0;
        addMouseListener (this);
        addMouseMotionListener
        (this);

        popup = new PopupMenu ();
        Menu colours = new Menu
        ("Colour");

        String [] colNames = {
        "Black", "Red", "Green", "Blue"
        };
        for (int i = 0; i < col-
        Names.length; i++)
        {
            MenuItem mi = new MenuItem
            (colNames [i]);
            mi.addActionListener
            (this);
            colours.add (mi);
        }

        popup.add (colours);
        add (popup);
    }

    public void processMouseEvent
    (MouseEvent e)
    {
        if (e.isPopupTrigger ())
            popup.show (this, e.getX
            (), e.getY ());
        else if (e.getID () ==
        MouseEvent.MOUSE_PRESSED)
        {
            prevX = e.getX ();
            prevY = e.getY ();
        }

        public void mouseDragged
        (MouseEvent e)
        {
            Graphics g = getGraphics ();
            int x = e.getX ();
            int y = e.getY ();

            g.setColor (col);
            g.drawLine (prevX, prevY, x,
            y);
            prevX = x;
            prevY = y;
        }

        public void mouseReleased
        (MouseEvent e) {}
        public void mousePressed
        (MouseEvent e) {}
        public void mouseClicked
        (MouseEvent e) {}
        public void mouseEntered
        (MouseEvent e) {}
        public void mouseExited
        (MouseEvent e) {}
        public void mouseMoved
        (MouseEvent e) {}

        public void actionPerformed
        (ActionEvent event)
        {
            String command = event.getAc-
            tionCommand ();
            if (command.equals ("Black"))
                col = Color.black;
            else if (command.equals
            ("Red"))
                col = Color.red;
            else if (command.equals
            ("Green"))
                col = Color.green;
            else if (command.equals
            ("Blue"))
                col = Color.blue;
        }
    }
}
```

```
(MouseEvent e) {}
    public void mouseExited
    (MouseEvent e) {}
    public void mouseMoved
    (MouseEvent e) {}

    public void actionPerformed
    (ActionEvent event)
    {
        String command = event.getAc-
        tionCommand ();
        if (command.equals ("Black"))
            col = Color.black;
        else if (command.equals
        ("Red"))
            col = Color.red;
        else if (command.equals
        ("Green"))
            col = Color.green;
        else if (command.equals
        ("Blue"))
            col = Color.blue;
    }
}
```

Listing 2: scribble.html

```
<html><head>
<title>Java Scribble</title>
</head><body>
<applet code="scribble.class"
width="400"
height="400"></applet>
</body></html>
```

These listings can be found
on this month's cover CD.

CASHBOOK

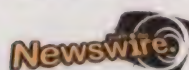


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ACP Tech

Getting data from Excel into an HTML document may seem like a simple task, but there are many ways to enhance the process. By Angus Kidman

Insite

Here is one scenario encountered frequently by budding Web site designers: you have a spreadsheet full of data which you want to publish on your site. What's the best way to get that data into HTML format?

Although at first glance the answer might seem to be obvious — just use the Save As function in your spreadsheet and export the data as HTML — that's not necessarily the best solution. What if you want tight control over the formatting of the resultant HTML? What if you simply can't stand the HTML code produced by your spreadsheet of choice? What if the people who regularly update that data have only a sketchy knowledge of HTML?

There are several solutions to all of those problems, but your choice may depend on your available applications and (as with many aspects of HTML) your own preferences. To demonstrate, we'll walk through a concrete example which I've been grappling with over the past year or so: a daily column on APC's Newswire site that provides an updated list of the prices for 10 key technology stocks.

While the specific application we developed can only be used for this function, it demonstrates some important

principles to consider when attempting to meld different kinds of content online.

Watch out

The Stock Watch column (located at <http://newswire.com.au/stockwatch/>) was introduced by Newswire in June 1999. The basic data used for the site was the prices of 10 Australian technology stocks, and the various totals calculated from them.

As with most pages on the site, its overall appearance was created with hand-coded HTML. We weren't aiming for a particularly complicated look, since the page would appear within the frames of the main Newswire site, but we did need the overall style to match the appearance of other documents on the site. The desired appearance of the basic Stock Watch table can be seen in figure 1. With our handwritten code, it renders almost identically in both Netscape Navigator and Microsoft Internet Explorer.

Having devised a standard look for the page, the next consideration was how to add information to it. The Stock Watch page needs to automatically calculate the percentage change in the values of each selected stock on a daily basis, and to assess the sum total of a

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If there is a topic you'd like to see APC cover in the Insite column, please email your suggestions to workshop@acptech.net.

portfolio of 1,000 shares in each of these stocks. This is the sort of task which is clearly best left to a spreadsheet; initially we constructed it using Excel 97, since that was the standard application used across the company (Lotus 1-2-3 or Quattro Pro would have done just as well). Each day, the journalist assigned to the column would enter in the new stock price data, and the relevant totals would be calculated automatically. Ideally, we would have automated the entry of this data as well, but timing considerations precluded that option.

The initial challenge was to get the data from Excel into an HTML page that matched the required formats. While using the Save As option may have seemed like a good choice initially, there were several problems with it. Firstly, (and not insignificantly), the standard installation of Office 97 supplied to our writers, for some unfathomable reason, didn't include the Save As HTML option, so we would have had to upgrade every writer's system to include it. Secondly, the code produced by Excel, while not as convoluted as some of Microsoft's earlier attempts at HTML conversion, was still larger than necessary.

Figure 2 shows Excel's first attempt at producing an HTML version of the Stock Watch chart. The total file size for this HTML was 8.5K. By comparison, the hand-coded page we built was 6.7K. That may not seem like a large difference, but when you're running a frequently visited

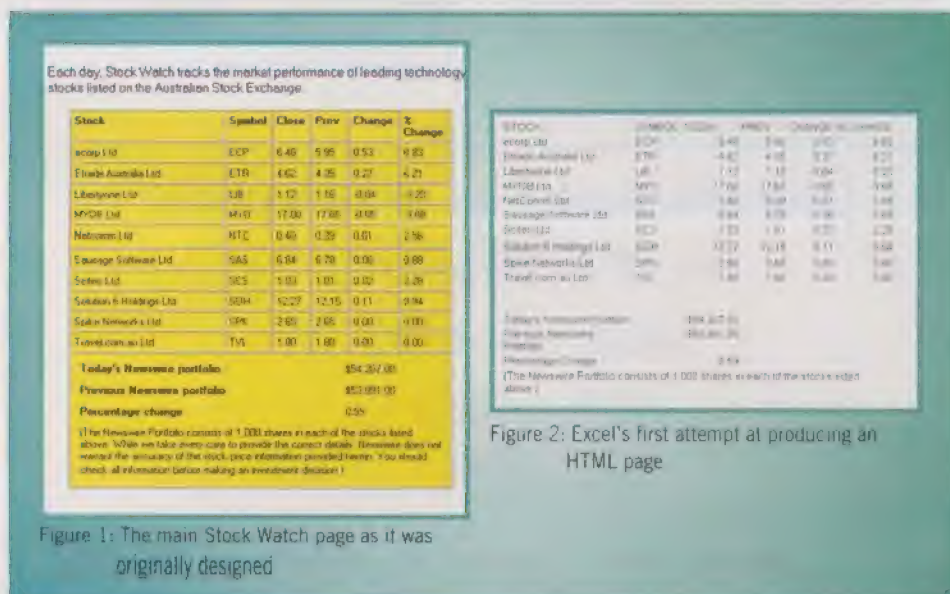


Figure 2: Excel's first attempt at producing an HTML page

Macro code listing

This is the macro used to import the Excel file (saved in DIF format) into Word and automatically populate the HTML file (which the macro assumes is already open). It was written to run in Word 6, but can work in more recent versions with minor modifications — subject to the restrictions noted in the article.

```
Sub MAIN
Dim Stock$(45), stuff$(45)
sourcefile$ = "today.dif"
REM Populate stock$() with variable names
counter = 1
For i = 1 To 10
  For j = 1 To 4
    REM Note: the next two lines are
    REM actually one line of code
    stock$(counter) = "STOCK" +
      Chr$(64 + i) + Chr$(48 + j)
    counter = counter + 1
  Next j
Next i
stock$(41) = "PORT1"
stock$(42) = "PORT2"
stock$(43) = "PORT3"
REM Read in values from main file for
REM stuff$() array
Open sourcefile$ For Input As #1
For i = 1 To 28
  Line Input #1, temp$
  REM temp$ is used throughout for lines
  REM which will be discarded
Next i
REM This set of loops reads in each of the
REM individual stock prices and changes
For i = 1 To 10
  For j = 1 To 4
    Line Input #1, temp$
  Next j
  For k = 1 To 4
    Line Input #1, a$
    alength = Len(a$)
    a$ = Right$(a$, alength - 2)
    stuff$(4 * (i - 1) + k) = a$
  Next k
Next j
Next i
Line Input #1, temp$
Next k
For j = 1 To 2
  Line Input #1, temp$
  Next j
Line Input #1, temp$
Next j
Line Input #1, stuff$(41)
stuff$(41) = Right$(stuff$(41), Len(stuff$(41)) - 2)
For i = 1 To 13
  Line Input #1, temp$
Next i
Line Input #1, stuff$(42)
stuff$(42) = Right$(stuff$(42), Len(stuff$(42)) - 2)
For i = 1 To 13
  Line Input #1, temp$
Next i
Line Input #1, stuff$(43)
stuff$(43) = Right$(stuff$(43), Len(stuff$(43)) - 2)
Close #1
REM This is the main find and replace loop
REM responsible for actually changing the
REM document
For i = 1 To 43
  StartOfDocument
  REM Note: the next four lines are all one line of code
  EditReplace .Find = stock$(i), .Replace = stuff$(i),
  .Direction = 0, .MatchCase = 0, .WholeWord = 0,
  .PatternMatch = 0, .SoundsLike = 0, .ReplaceAll,
  .Format = 0, .Wrap = 1
Next i
End Sub
```

Web site, every single character can count. It's also worth noting that the version produced by Excel was the most basic layout it could come up with. By changing the background colour of the cells to yellow (an element we wanted in the final design), the file size increased by another 1K. This gives an indication of how much Office favours a code-heavy formatting style over more concise options. In any case, getting Excel to mimic the style of the Newswire site probably would have been impossible; Excel is built to encourage precise physical formatting, unlike HTML, and wouldn't include essential options such as alternate font tags to cater for different systems.

One option for cutting down the file size would have been to use one of the many excellent HTML clean-up utilities available, such as the W3C's Tidy utility (featured on APC's April cover CD). Macromedia's Dreamweaver software also includes excellent tools for cleaning up Office-generated code. However, this would add yet another tool to the growing list of applications needed to generate the table, and wouldn't help to make the formatting match exactly with our original requirements. Clearly, we needed a different method of exporting the Excel data into the final page.

For the first few months of Stock Watch's life, I confess to adopting a somewhat low-tech solution. Each day, I would enter the new values for the stocks into the Excel spreadsheet, and then print that page out. I'd then open up the original HTML page in a text editor and type in each of the recalculated values, before saving the page with a new name and sending it to our electronic production group for posting on the site.

This method was effective, but time-consuming and prone to error, as I had to enter 43 individual values by hand each day. When work pressures made it essential to hand over the task of writing Stock Watch to another journalist, this method was no longer appropriate, since hand-editing HTML code is not a task for the faint-hearted.

Macro solution

Faced with a tight deadline, I decided on a solution which required just two applications: Excel and Word. As I had a reasonable amount of experience in writing macros in Word 6, including some which manipulated HTML code, I decided to use a Word macro as the basic building block.

Stock Watch data codes

STOCK	SYMBOL	TODAY	PREV	CHANGE	% CHANGE
ecorp Ltd	ECP	STOCKA1	STOCKA2	STOCKA3	STOCKA4
Etrade Australia Ltd	ETR	STOCKB1	STOCKB2	STOCKB3	STOCKB4
Libertyone Ltd	LIB	STOCKC1	STOCKC2	STOCKC3	STOCKC4
MYOB Ltd	MYO	STOCKD1	STOCKD2	STOCKD3	STOCKD4
NetComm Ltd	NTC	STOCKE1	STOCKE2	STOCKE3	STOCKE4
Sausage Software Ltd	SAS	STOCKF1	STOCKF2	STOCKF3	STOCKF4
Scitec Ltd	SCS	STOCKG1	STOCKG2	STOCKG3	STOCKG4
Solution 6 Holdings Ltd	SOH	STOCKH1	STOCKH2	STOCKH3	STOCKH4
Spike Networks Ltd	SPK	STOCKI1	STOCKI2	STOCKI3	STOCKI4
Travel.com.au Ltd	TVL	STOCKJ1	STOCKJ2	STOCKJ3	STOCKJ4

Today's Newswire portfolio	PORT1
Previous Newswire portfolio	PORT2
Percentage change	PORT3

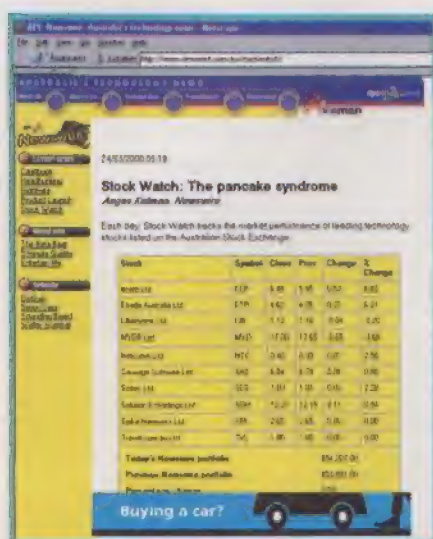


Figure 3: Stock Watch as it appears today

Word 6 was chosen over its successors because, in its original release, it *doesn't* include any support for HTML, and instead opens HTML files as plain text. This makes it easier to manipulate the contents using Word's extensive macro language without Word insisting on either saving the files in Word format or adding a spurious .TXT extension to every file it touches. (These problems could be overcome with sufficient extra code, but this didn't seem essential at the time.) I chose Word in preference to Excel purely because I was more familiar with its macro language (the two are similar but not, in version 6, identical).

The resultant 'application' is shown in the macro code listing. I make no claims as to the elegance of this program. There are many areas where it could be tidied up and written more precisely, and it betrays my youthful background in writing Basic code without any consideration for subroutines or other effective devices — but it does accomplish the required task fairly easily.

From the point of view of an end user, the approach is fairly simple. Each day, the assigned Stock Watch writer opens the previous day's Excel file, copies over the prices from the 'close' column to the 'previous' column, and then enters the new closing prices. This file is then saved in .DIF (document interchange format) with the filename TODAY.DIF. Switching to Word, the writer opens the standard template file (called, not surprisingly, TEMPLATE.HTM) and saves it under a new name. The macro is then run (using either a keyboard shortcut or a menu option) and automatically enters all the correct data for the day. The page is now ready for publishing, and the writer needs no knowledge of HTML.

How does the application work? Basically, it performs a simple find and replace operation; this is the last section of code in the listing, but the most important. Each cell with a changing value in the spreadsheet (prices, percentage changes and totals) is assigned a unique name, based on which stock it refers to (named from A to J) and which column it is in (named from 1 to 4). This is outlined in diagram form in 'Stock Watch data code', below the macro listing.

The word STOCK is appended to each of these variable names to ensure that the value doesn't occur elsewhere in the HTML source page (as might easily occur if simple letter and number combinations occurred; the H1 tag might be used for headings, for instance). The find and replace routine looks for each of these STOCK variables (and a similar set labelled PORT for the portfolio titles) in the HTML template page and replaces them with their actual value from the spreadsheet.

By cycling through the stock\$() array, which contains these variable names, and the stuff\$() array, which contains the values read from the spreadsheet TODAY.TIF, each independent value in the spreadsheet is added into the HTML page. Thus, the value STOCKA1 is replaced with the price of ecorp's closing stock as read from the spreadsheet, STOCKA2 with its closing price the previous day, STOCKA3 with the percentage change, and so on.

All of this is accomplished with the EditReplace command, enclosed in a suitable loop at the end of the document. Most of the macro is concerned with populating the two arrays correctly to make the find and replace operation work.

The first part of the listing simply populates the stock\$() array with the values STOCKA1, 2, 3, 4 through to STOCKJ1, 2, 3, 4, and then PORT1, 2, 3. This can be fairly easily accomplished with an embedded loop.

Reading in the data from the DIF file is a simple but repetitive task. One advantage of the DIF format is that it places each piece of spreadsheet data on a separate line, which makes it easy to locate individual items by identifying their line number. Many of the repeated loops in the main body of code are simply designed to skip the unwanted data and read the required values from the correct positions. Also, the actual price values are always preceded by a zero and a comma, and these need to be stripped out on each occasion.

Suitably adapted, this procedure could be used to import spreadsheet data in any

Other options

Clearly, the technique we used to create and update the Stock Watch page is only one of many possible options. To do the actual calculations, we could have used a Visual Basic application built in either Word or Excel, a simple JavaScript, CGI or Java application, or even a custom form built within our Notes publishing system. Advanced integration tools like ColdFusion and ASPs could have also done the job.

The same group of applications could also have been used to convert the entered data into a format suitable for presentation online. Regardless of the method used, we could have chosen to further automate the process by having the stock price data picked up online automatically, rather than being entered manually (however, this would inevitably require more sophisticated scripting than Word 6 could offer). The solution we chose reflected, as much as anything, the available tools and the expertise we had on hand at the time. And, most importantly, it works.

format into any kind of HTML page. Of course, each spreadsheet has a different format, so you need to take time to work out which lines are required and which need to be skipped.

However, because the macro itself doesn't care what the formatting of the HTML page is — it simply looks for certain key values and replaces them — it's easy to update the underlying appearance (by changing the template file) without having to change the data entry procedure.

As noted earlier, this is not an example of macro writing at its finest. A more elegant application would make use of a subroutine for the repeated reading in of data and for the stripping of unwanted characters. It might also allow the user to choose which file is to be processed, rather than always forcing the use of the same filename. The process of opening and saving the source template file could also be automated.

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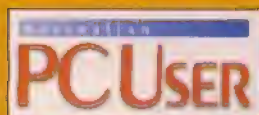
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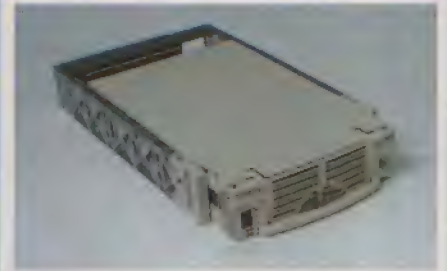
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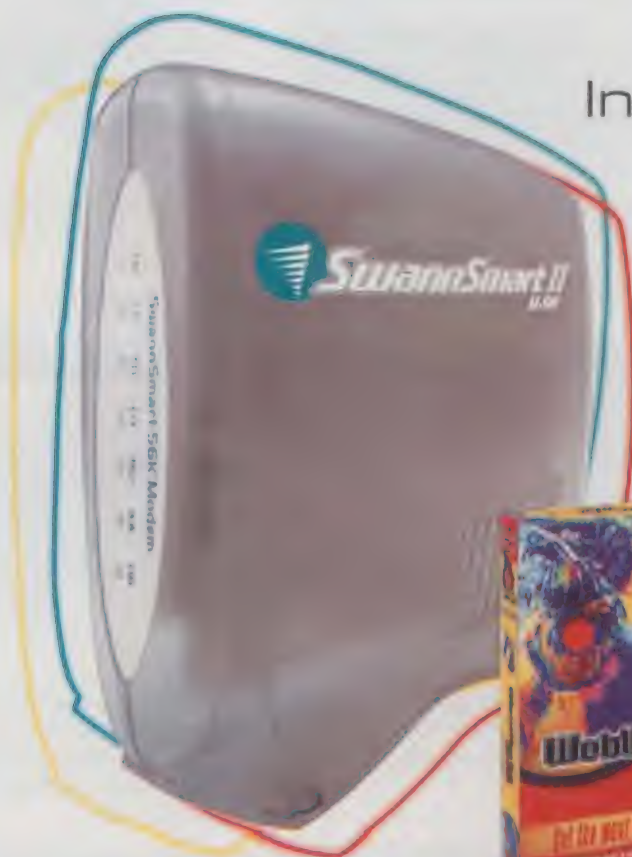
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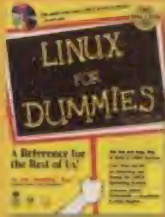
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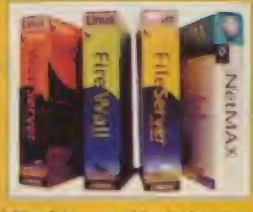
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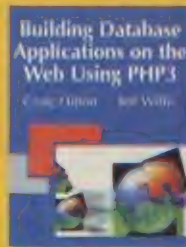
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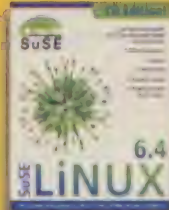
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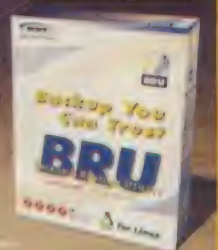
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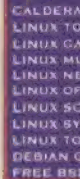
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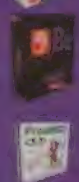
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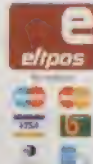
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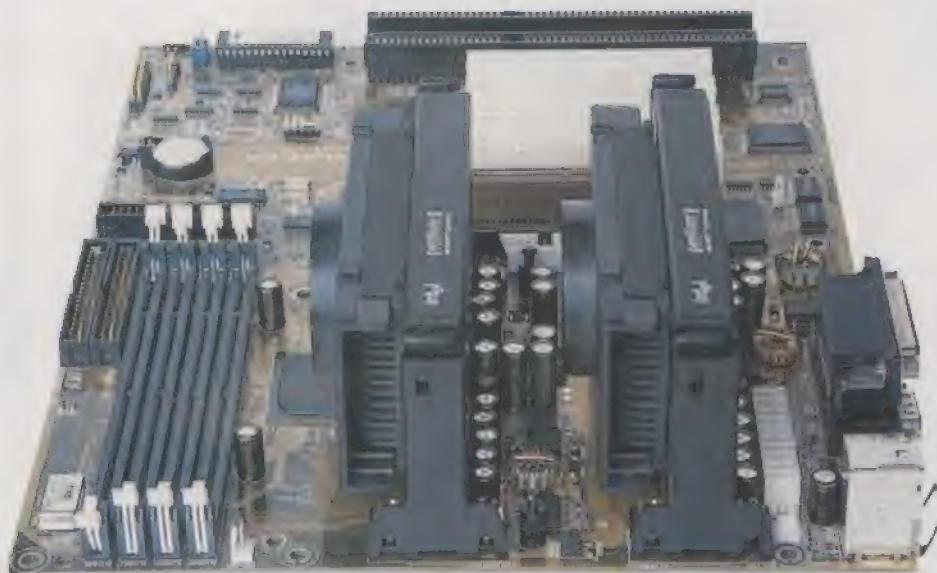
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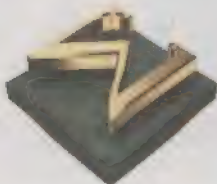
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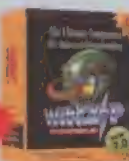
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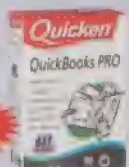
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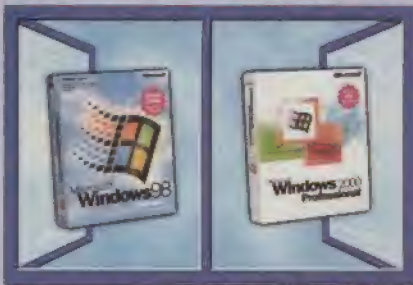
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CC-6BKHC	BJI-201BK HC	BJC-600/610/620 Hi-Cap Black (14ML)	\$9.00
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CANON BJC-3000/6000
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9
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HP Desk Jet 850C/855C/870C/1000C Series
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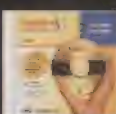
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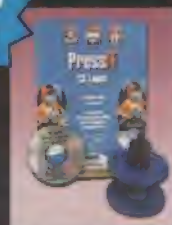


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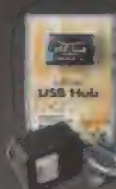
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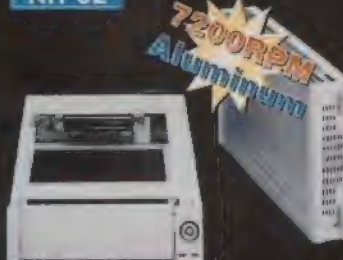
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OPERATE your MODEM, MULTIPLE MODEMS, or your EFT-POS on your FAX LINE

AUTO MODEM RECEPTION

Choose **FMX-PRO** when you wish to fit a Modem to your Fax line and the Modem also needs to receive data calls. Directs Fax calls to your Fax and Data Calls to Modem. Barge-In protection is provided to prevent one device interrupting the other while it is in use.



OUTGOING MODEM or EFT-POS

Choose **AUTO-CONNECT** when you wish to fit a Modem or EFT-POS unit to your Fax line, to make OUTGOING calls. Provides automatic connection on dialing. Other device is then locked out. Ideal for connection of Payphones, Modems and EFT-POS to any Fax, Commander, PABX or any type of Telephone line.



MULTIPLE MODEMS

Choose **AUTO-SELECT** when two or more Modems need to be connected to a Fax or dedicated Modem line. Fit up to eight Modems, or seven Modems and one Fax to the same line. Incoming calls are automatically routed to any device. Barge-in protection is provided.



IMPROVE the EFFICIENCY or PROFESSIONALISM of any ordinary TELEPHONE LINE

MUSIC OR MESSAGE ON HOLD FACILITY FOR ANY LINE

No longer is this important business facility restricted to Commander or PABX systems. Simply connect any radio, cassette, digital player, or even your PC to this low cost unit and add a professional touch to any existing line!



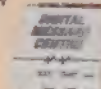
TELEPHONE CALL TRANSFER

Now you can answer a call on one telephone and then transfer the call to another telephone fitted to the same line, using your existing telephones. You can even use your phones as an intercom. No special wiring required. Up to 8 extensions per line. Barge-in protection is also provided.



DIGITAL MESSAGE CENTRE FOR MESSAGE ON HOLD

HIGH QUALITY Royalty Free Generic or Customized Digital Message for new installations or as a direct 'plug in replacement' for a Radio on Hold connected to any PABX, Commander or Key Telephone System.



DOOR STATION FOR ANY LINE

When a visitor presses a supplied door phone mounted at your front door or gate, your telephones will ring allowing you to answer and converse from any telephone. If your line is in use, a Call Interrupt facility will alert you. You can even open the gate or door with a command from your telephone.



HIGH QUALITY INTERCOM SYSTEM

INTERPHONE provides LOUD, CLEAR, telephone quality INTERCOM communication for 2 to 64 telephone handsets. Simply pick up any telephone and dial the desired telephone. InterPhone uses its own telephone cable, but does not connect to a Telecom line.



TWO LINE SELECTOR

Now you can connect TWO telephone lines (Telstra, Optus, ISDN or Tie Line) to one Fax, Modem, Cordless Telephone, Answering Machine or any Telephone device. Receive incoming calls from either line. Make outgoing calls on either line.



Turn ON, Turn OFF or RESET your PC, NETWORK or any ELECTRICAL device by TELEPHONE

REMOTE TELEPHONE ACTIVATOR

RTA will allow you to call in on your telephone line and SWITCH ON, SWITCH OFF, or RESET up to 6 separate electrical appliances, PCs or Networks using a touch tone telephone and PIN Number. Our Line Sharing technology means you can use it AUTOMATICALLY, on any existing line.



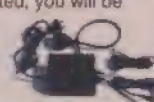
PC RESET UNIT

This low cost accessory for use with our RTA, is designed for quick and easy user fitting, direct to the back of ANY PC. Once fitted, you will be able to call in and RESET your PC from any Touch Tone Telephone, at any time, from anywhere in the world!



POWER CONTROL UNIT

This RTA accessory provides you with a simple '2 minute plug in' solution for controlling remote electrical equipment. Once fitted, you will be able to call in and TURN ON, TURN OFF or RESET the power connected to any Electrical Device from any Touch Tone Telephone.



TELEPHONE LINE SIMULATORS for TESTING, TRAINING or DEMONSTRATION of all TELEPHONE EQUIPMENT

RINGMASTER STD

This compact low cost device allows any two Telephone devices to ring and communicate with each other, without the need to connect to Two Telecom lines. Save 25c per call. Ideal for the Testing, Training & Demonstration of all telephone devices. Operation is Bi-Directional.



RINGMASTER PRO

Provides all of the facilities of our STD device and in addition generates Australian Dial Tone, Busy Tone and Disconnect Tones as appropriate. This unit also generates ALL EIGHT TELSTRA RING PATTERNS planned for use in Australia, including FaxStream Duet, EasyCall Multiple Number and Diverted Call rings.



RINGMASTER CLI

Provides all of the facilities of our PRO device and in addition generates TEN SEPARATE CALLING NUMBER DISPLAY (CND) test transmissions, in conjunction with any TELSTRA RING PATTERN. Alphanumeric and User Definable CND transmissions are also provided for.



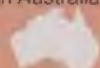
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Aopen ATX case, HT95 Desktop 250W power supply	\$120.00
Aopen ATX case, HX08 Full Tower 300 W power supply	\$210.00
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Aopen ATX case, HX48 Midi tower 300W power supply	\$150.00
Aopen ATX case, HX95 Desktop 250W power supply	\$125.00
Aopen ATX case, MT85 Micro ATX mini tower	\$97.00
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Macase ATX case, C88 full tower 300w power supply	\$248.00
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Macase ATX case, K510 midi tower 250w power supply	\$127.00
Macase ATX case, K510 midi tower 300w power supply	\$147.00
Macase ATX case, K88 midi tower 250w power supply	\$125.00
Macase ATX case, K88 midi tower 300w power supply	\$145.00
Macase ATX case, KA-588 midi tower 250w power supply	\$127.00
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motherboards

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Abit Slot 1 M/B BF6, ATX, bundled with HotRod 66	\$239.00
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AOpen Slot 1 M/B AX6C-L 820 chipset 2x RIMM slots	\$296.00
AOpen Socket 370 M/B MX3WPro, VGA/Sound, FC-PGA	\$215.00
AOpen Socket 370 M/B MX3WPro-E, VGA/Sound, FC-PGA	\$240.00
AOpen Super 7 M/B MX59PRO ATX, U/66, VGA/Sound on board	\$175.00
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Asus Super 7 M/B P5A, ATX, on board audio	\$175.00
Asus Super 7 M/B P5A-B, Baby AT	\$179.00
Asus Super 7 M/B PSS-B, Baby AT with on board AGP video	\$159.00
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Epox Slot A M/B EP-7KXA AGP x4 PC133	\$290.00
Epox Super 7 M/B EP-MVP3G-2 ATX UDMA/66	\$185.00
Micro-star Slot A M/B K7Pro (MS-6195) for K7 Athlon	\$270.00
Soyo Slot 1 M/B SY-6BA-IV BX chipset, ATX	\$229.00

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Sound card, Diamond MX400 Monster sound OEM	\$129.00
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Sound card, Sound Blaster Live! Value Digital OEM	\$119.00
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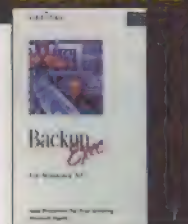
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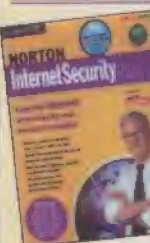
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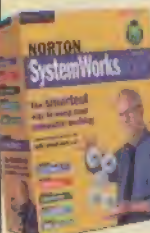
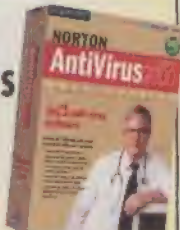


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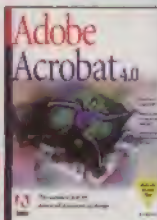
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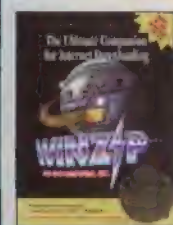
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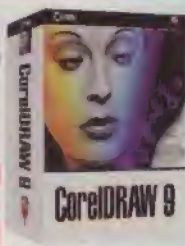
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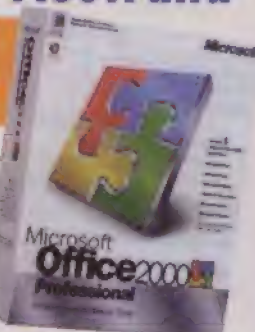
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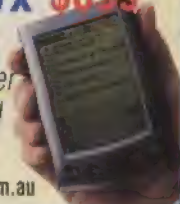


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No. of Refills

60
9
7
16
45
9
6
6
6
6
6
12
12
12
6
6
6
12

Kit Code

21-BKL
3-BKL
4-BKL
5-BKL
19-BKL
18-BKL
46-BKL
8A-BKL
8B-BKL
29-BKL
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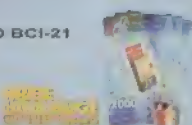
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No. of Refills

3x30
3x12
3x6
3x30
3x4
3x12
3x12
3x3
3x3
3x4
3x12
3x12
3x12
3x6
3x6
12/Colour

Kit Code

22-CLR
25-CLR
10-CLR
17-CLR
47-CLR
14A-CLR
14B-CLR
30A-CLR
30B-CLR
16-CLR
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Sony Dat 40-8G Int SCSI	1322
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External Case	336
Sony 4mm 90M 2G DDS Tape	55
Sony 4mm 120M 4G Tape	131
Sony 4mm 125m 12-24G Tape	285
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9.1GB Fujitsu U2W 10000rpm	891
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Sound Blaster Live Value OEM	125
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Logitech Home Internet Camera	163
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32M Matrox Millen G400 Max	514
Matrox Marvel G400 Video Capture 705	
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16M Voodoo III 3000 AGP	285
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Logitech 3 Buttons Serial Mouse	25
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Gigabyte GA-SAA AT	145
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17" Diamond Tron 1795 0.25 dot/640	
15" /17" Goldstar 520S/775A 287/514	
15" /17" S5E/75E Samtron	276/442
15" Samsung 550S/550ms	304/390
17" Samsung 750S/750MS	521/594
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56K US Robotic Voice V90	216
56K US Robotic Message V90	254
56K US Robotic Message Pro	292
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Epson Stylus1200 A3	886
Epson 1520/3000 A2 Size 996/2067	
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HP 895CXi	615
HP 1120C A3	743
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HP 2500C/2500CM	1997/2891

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HP LaserJet 1100A with Scan	917
HP Colour LaserJet 5/5M 5387/7074	
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HP LaserJet 4000/NTN	2752/3401
HP LaserJet 2100/TN	1363/1864
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HP Jet 8000/NTN 4654/5163/6001	
HP OfficeJet 725C/1170C 823/1394	
HP OfficeJet 3100	1375
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K3BK	6	K11CLR	6
K1BK	6/9	K9CLR	12
		K25CLR	6
K7BK	60	K1CLR	30
K8BK	7	K2CLR	12
K4BK	9	K2CLR	12
		K23CLR	6
K9BK	7		
K10BK	16	K3CLR	8
K11BK	12	K4CLR	4
K12BK	9/80	K5CLR	30
K12BK	60	K5CLR	30
K12BK	9	K5CLR	30
K27BK	9	K5CLR	30
K28BK	12	K35CLR	6
		K36CLR	6
K10BK	2	K24CLR	6
		K15CLR	6
K13BK	12	K26CLR	6/12
K16BK	12	K7CLR	6/12
K14BK	12	K6CLR	12
K15BK	6	K8CLR	6
K17BK	12	K20CLR	6/12
K17BK	12	K8CLR	6
K17BK	12	K17CLR	6/12
K21BK	3	K34CLR	3
K26BK	12	K16CLR	6/12
K6BK	12	K16CLR	6/12
K6BK	12	K35CLR	6
		K34CLR	6/12
K18BK	6	K13CLR	12
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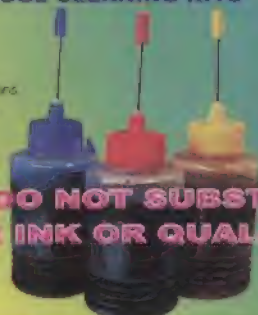


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HP DESKJET 720/890/Officejet 1150	6	H13
HP DESKJET 1200 B, Y, C, M	6	H8
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EPSON STYLUS 400/800/1000	8	E1
EPSON STYLUS COLOUR / PRO / XL	6	E2
EPSON STYLUS 820 / COLOUR 11/11S/200	12	E4
EPSON COLOUR 400/500/600/700/Photo 1x	12	E7
EPSON COLOUR 440/640/740/800/850/1520	12	E7
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CANON BJC6000/6100/620	8	C6
CANON BJC4000/4100/4200/4550 BCI-21	30	C9
CANON BJC 7000	6	C16
HP DESKJET 400, 500 & 600 SERIES	12	H3/H5
HP DESKJET 820C/850C/855C/870C/1000C	6	H7
HP DESKJET 720/890/Officejet 1150	4	H14
EPSON STYLUS COLOUR / PRO / XL	6	E3
EPSON STYLUS 820/COLOUR/11/11S	12	E5
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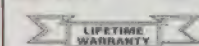
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Canon/Apple BJC-4000/5600	BC-20	3 0488
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HP Deskjet 600 Series	51629A	2 1488
HP Deskjet 800 Series/1600c	51645A	2 1288
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Epson Stylus Colour/Photo XL	S020034/62	4/2 2288
Epson Stylus Colour 820/11/11s	S020047	4 2088
Epson Colour 400/500/600	S020093	6 1888
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Canon BJC-7000	BCI-61	3x4 51XX
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HP Deskjet 600 Series	51649A	3x10 130X
HP Deskjet 800 Series/1600c	51641A	3x6 11XX
Epson Stylus 200/500	S020097	3x10 190X
Epson Stylus Colour/Photo XL	S020036/66	3x6/2 210X
Epson Stylus 820/11/11s	S020049	3x10 190X
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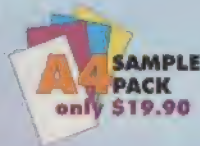
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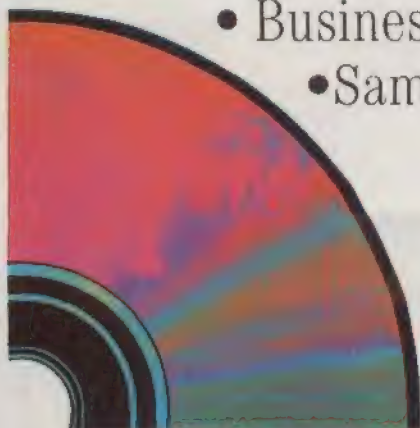
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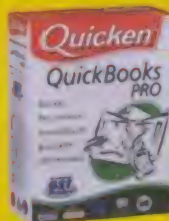
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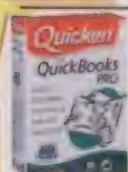
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Inc Tax	\$1,499	\$3,260	\$2,355	\$2,837

*NO MONITOR

	C500MHz	PIII550MHz	PIII600MHz	PIII667MHz
Processor	C500MHz	PIII550MHz	PIII600MHz	PIII667MHz
RAM St/Max	64MB/512MB	64MB/768MB	128MB/1GB	128MB/1GB
Hard Disk	6.4GB	6.4GB	13.5GB	13.5GB
Graphics	8MB equiv	2 x 8MB	16MB	16MB
CD-ROM	optional	32x max	40x max	40x max
Win 95				
Part #	(91432)*	(79711)*	(91411)*	(91413)*
Rent 3 Yrs**	\$17.30	\$29.30	\$29.53	\$33.46
Inc Tax	\$1,594	\$3,457	\$3,474	\$3,940
Win NT				
Part #	(86164)*	(79594)*	(91412)*	(91414)*
Rent 3 Yrs**	\$19.38	\$29.76	\$30.23	\$34.15
Inc Tax	\$1,789	\$3,498	\$3,552	\$4,035

** RentSmart rates are higher when Equipment value is less than \$2,000

Presario

Plug into the new range of Presario PCs to experience cutting-edge multi-media, quick Internet access and high-powered features that will simply blow you away. Offering breakthrough value, these PCs are power-packed to meet the individual needs of a growing family by providing the latest and hottest in multimedia computing enhancing 3D effects, animation, imaging & video.



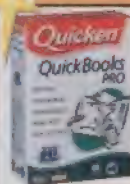
	Processor	C500MHz	PIII500MHz
	RAM St/Max	64MB/320MB	64MB/320MB
	Hard Disk	8GB	13GB
	Graphics	8MB	8MB
	Modem	56K/V.90	56K/V.90
	Drives	40x CD-ROM	40x CD-ROM
	Op System	Win 98	Win 98
No Monitor	Part#/Rent**	(91127)* \$17.07	(91130)* \$17.30
	Inc Tax	\$1,575	\$2,039
15" Monitor	Part#/Rent**		(91137) \$21.46
	Inc Tax		\$2,528
17" Monitor	Part#/Rent**		(91138) \$22.15
	Inc Tax		\$2,599

Compaq Monitors

15" MV520
Monitor
\$411

(86202)

17" MV720
Monitor
\$615
(86205)



QuickBooks
PRO
\$199

When purchased with a Compaq system, QuickBooks invoices, tracks unpaid bills, calculates charges on overdue payments, shows users what they owe, and more. See Web Direct for more info

***RentSmart**
The figures shown are based on a per week basis over 3 years. To approved persons, Terms and Conditions apply. GST May apply to commitments made now! Refer to Page 2 for more details.

MAX
5

Sales: 1300 13 9999
Fax: 1300 13 6666

Website: www.ht.com.au
E-mail: sales@ht.com.au

**Do you want Fly
Buys with that?**

Apply Online And Get the Technology You Need- Today!

RentSmart is the first business rental finance company in Australia to enable you to apply and be approved for finance over the web. You can be approved to spend up to \$15,000 to get all the computers and office equipment your business needs.



Get the computers and office equipment your business needs NOW.

It's as easy as 1 2 3!

- 1 - Complete the online application via:
www.ht.com.au/cat/rentsmart
- 2 - Get preliminary approval ONLINE*
- 3 - Pick up the equipment you need TODAY** from Harris Technology
 - No deposit
 - No cash payments
 - Just low-cost monthly rental payments



Renting is the cost-effective solution for many businesses to get the technology they need to succeed, Find Out More...

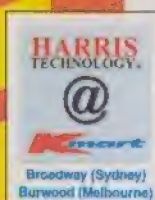
Phone Harris Technology now on

1300 13 99 99 or RentSmart on 1800 688 777



6 Reasons why it's Smarter to Rent

- 1 **Save Money** - Renting doesn't tie up working capital, and is tax deductible.
- 2 **Make it Easy** - Low cost monthly rental fees make it easy on your cash flow.
- 3 **Stay Ahead** - Renting equipment is easy to upgrade to the latest technology.
- 4 **Get More** - Renting lets you get all the equipment you need NOW!
- 5 **More Choice** - Find the equipment that best suits your needs, and rent and SAVE
- 6 **It's fast** - Online applications are fast and secure. Apply now and pick up the equipment you need today.



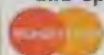
GST

Rental repayments include GST from 1 July 2000. Repayments will increase up to 10%. This increase will apply to all rentals whether entered into before or after 1 July 2000. If you are in business you may be entitled to an input tax credit of up to 100% of the GST part of any repayment you make. You should seek your accountant's advice as to your entitlement.

* RentSmart is available to qualifying customers on selected products with a total retail value above \$500.
** Subject to equipment availability. Rental repayments may be subject to change for GST

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Pricing** and specifications herein are subject to change without notice.



Finance methods
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Web
Directwww.ht.com.au/cat/hpCheck
for latest
prices &
products

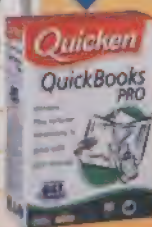
HP with FREE GST-Ready Quicken

HP Brio special GST Bundles

Quicken

	BA400/15	BA400/17	BA600/15	BA600/17
CPU	Celeron®	Celeron®	Pentium® III	Pentium® III
Speed	533MHz	533MHz	550MHz	550MHz
RAM	64MB	64MB	64MB	64MB
HDD	10GB	10GB	10GB	10GB
LAN	10/100	10/100	10/100	10/100
Monitor	15"	17"	15"	17"
CD-ROM	48x	48x	48x	48x
Part	(95561)	(95562)	(95563)	(95564)
Price	\$2,129	\$2,289	\$2,479	\$2,659
Rent/Wk	18.00	19.38	21.00	22.61

Each system also includes 4 watt HP Speakers



GST Direct Assistance
You may be eligible for a \$200 Rebate.

Each of these special Brio/Omnibook Bundles includes QuickBooks PRO Version 7 OEM AND Quick Payroll PRO Version 6 OEM to help your business more easily comply with the GST requirements. QuickBooks PRO V7 is GST-Ready.

**GREAT BUNDLE
GREAT VALUE**

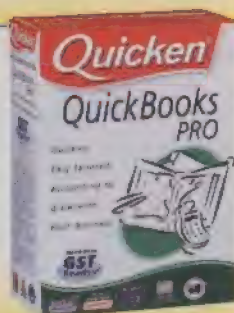
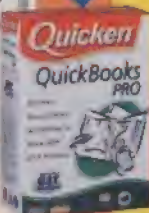
HP OmniBook XE2

Great Value!



	XE2 C-450	XE2-PIII 500
CPU	Celeron®	Pentium III®
Speed	450MHz	500MHz
Screen	12.1" TFT	14" TFT
RAM	64MB	64MB
HDD	4GB	6GB
Modem	56K Modem	56K Modem
CD/DVD	24X CD-ROM	6X DVD-ROM
Op Sys	Win 95/98	Win 98
Part	(95567)	(95569)
Price	\$3,529	\$4,995
Rent / Week	30.00	42.23

Each includes QuickBooks PRO V 7



GST-Ready Software

Quicken

For small to medium sized businesses. QuickBooks is the world's best selling financial management and accounting system. QuickBooks PRO is multi-user capable, features advanced job costing & budgeting, time tracking & billing, integrated estimating & quoting. Can be used for either cash or actual accounting. QuickBooks PRO 7 is GST-ready.

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Fax: 1300 13 6666

Website: www.ht.com.au
E-mail: sales@ht.com.au

See Page 2 for Locations

MAY
7



Speedy Delivery
Australia Wide

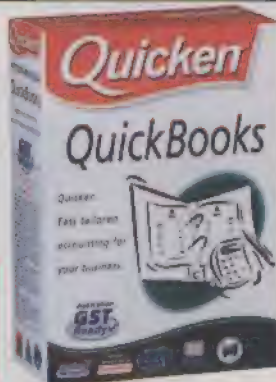


For LIVE pricing or to order see...

www.ht.com.au/cat/quicken

Is your business ready for the GST?

QuickBooks



Designed for small to medium businesses. Handles inventory and double entry Accounting. Keeps track of bank balances, loans and other finances. Calculates charges on overdue payments, monitors unpaid bills, writes and prints cheques, records stock and offers 79 different financial graphs and reports. QuickBooks is GST Guaranteed.

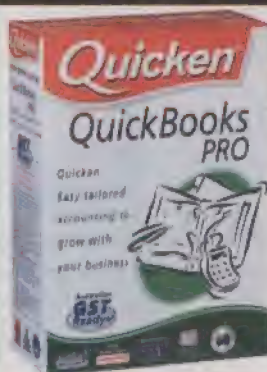
- Manages small business finance
- Invoicing and debt management for small business
- Insights into finance
- Accounts receivable / debtors tracking
- Accounts payable / creditors tracking
- Inventory and purchase order control
- Customisable invoices and statements
- Cheque preparation and printing

**NEW
VERSION**

(94375)

\$179

QuickBooks PRO



With all the features of QuickBooks, QuickBooks PRO allows you to allocate staff time and material costs to a job or project. The additional time management tools, cost estimating and employee hours can flow directly on to invoices. Get an instant snapshot of your business with up to 90 financial reports and graphs.

- Advanced job costing and budgeting
- Cheque and credit card account reconciliation
- Flexible and customisable reporting
- 90 Reports and graphs
- Cheque preparation and printing
- Sales tax calculation
- Estimates for better quoting
- Time tracking/on-screen timer

**NEW
VERSION**

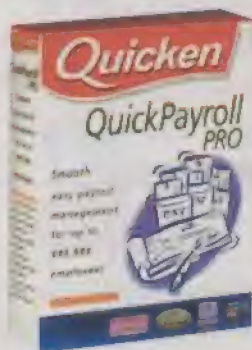
(94377)

\$299

QuickPayroll PRO

Take the stress out of managing your payroll. Produces your group certificates, looks after tax file numbers, bank details, deductions, holidays, sick leave and terminations.

Print payslips, customise your reports, look after Fringe Benefit Taxes



(FBT) and remit FBT payments and group certificate data directly to the ATO. Handles up to 999,999 employees. Gives insights into finances and calculates variable rates of pay. Quick Payroll PRO has recently been awarded Australian PC User Best Buy. Integrates with QuickBooks or QuickBooks PRO to simplify managing your business.

(77589)

\$284

QuickPOS with QuickBooks PRO

The Ultimate Cash Register!

With the upcoming GST, retailers both small and large will require systems that can adequately handle the intricacies of the tax. Quicken's QuickPOS point of sale software has the

same operation and features of a powerful electronic cash register and at the press of a button transfers all sales into QuickBooks PRO for full back office accounting and management. By using QuickPOS, retailers are assured of being able to cope with the introduction of the GST. Software features such as integrated EFTPOS, lay-by and support for scales mean QuickPOS is suitable for all retail environments - from high volume to specialty. Includes free upgrade to v3 giving you even more:

- Label printing
- Additional hardware support
- GST/Sales Tax management
- Customer loyalty



**FREE
UPGRADE
TO V3**

(84232)

\$874

*When you register the program

Be sure to check all of the Quicken options available from the Web-Direct link.

We also stock Quicken Personal, Quicken Deluxe and Quicken Business. Suitable for small business or individual users. A \$29.95 GST upgrade applies to the programs mentioned in this sidebar.

MAY
8

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Pricing** and specifications herein are subject to change without notice.



Finance methods
subject to approval

MYOB

Web
Direct

www.ht.com.au/cat/myob

Simply makes the GST less taxing



MYOB accounting products handle both the current Wholesale Sales Tax (WST) and the approaching GST with ease, allowing you to prepare now and smoothly make the transition from WST to GST. The extensive GST features enable you to effortlessly collect, pay and report GST.

MYOB FirstAccounts

The ideal first accounting system and starting point for small service-based businesses. MYOB FirstAccounts makes it easy to track income and expenditure, create and print invoices, statements, purchase orders etc. The Card File feature allows you to record the contact details of all your customers and suppliers in the one simple database. Produce Profit & Loss and other key reports with the click of a mouse. Simple to set up and powerful enough to handle all the needs of small service businesses. GST-READY.

Compatible with Win 95/98 or later, NT 4.0 or later, Mac OS 8.0 or later.

(85770) **\$159**

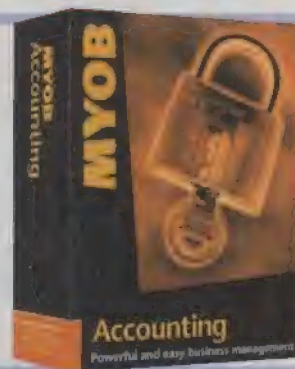


MYOB Accounting

The comprehensive single-user accounting system which caters for both service and inventory based businesses with around 1-10 employees. MYOB Accounting features: invoicing, receivables, purchasing, payables, cash book, powerful Inventory, purchasing, job costing, general ledger and extensive reporting. Also includes OfficeLink - the dynamic link to Microsoft Office. Everything you need to build a better business. GST-READY.

Compatible with Win 95/98 or later, NT 4.0 or later, Mac OS 8.0 or later.

(85771) **\$319**

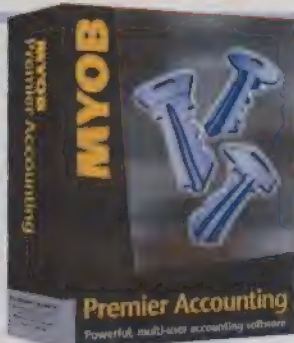
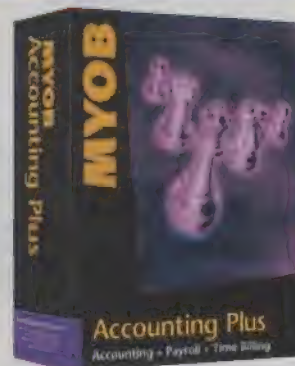


MYOB Accounting Plus

Extends the functionality of MYOB Accounting with the addition of professional time billing and fully integrated payroll. Suited to both service and inventory based businesses with 1-30 employees. The fully integrated payroll feature means that the instant a pay run is processed, all related accounts are updated - payroll made easy. Courtesy of the new time billing module, along with meeting the needs of thousands of different types of small businesses, MYOB Accounting Plus is also perfect for professionals such as architects, consultants, lawyers, graphic designers - and anyone who bills by the time they spend on a project or with a client. Includes OfficeLink. GST-READY.

Compatible with Win 95/98 or later, NT 4.0 or later, Mac OS 8.0 or later.

(85772) **\$439**



MYOB Premier Accounting

Includes all the features and functionality of the other MYOB accounting products, plus enhanced inventory (flexible pricing matrix for different types of customers), the ability to handle multiple currencies and powerful multi-user access. Includes 3 user licences - it's easy to add more at anytime. Includes OfficeLink. GST-READY.

Compatible with Win 95/98 or later, NT 4.0 or later, Mac OS 8.0 or later.

(85773) **\$865**

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MAY
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TOSHIBA

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Compare Satellite models

Check for latest prices & products

Wine on-line?



vintagecellars.com.au

Toshiba Install options

For a small extra charge we can install your chosen options into your new Toshiba: a modem, more information.



Rental Figures quoted are for business use, includes stamp duty and FID for NSW, to approved purchases. Rental price quoted are subject to change for GST - see page 2 for details

	Satellite 2180CDT	Satellite 2670DVD	Satellite 2650XDVD
Processor	AMD 475MHz	Pentium III 450MHz	Celeron 466MHz
RAM Std/Max	64/192 MB	64/192 MB	64/192 MB
Hard Disk	4GB	6GB	6GB
Screen	12.1" TFT	12.1" TFT	14.1" TFT
Display	800 x 600	800 x 600	1024 x 768
CD-ROM	Yes	Yes	Yes
Mic & Spkr	Yes	Yes	Yes
Port replicator	No	No	No
Select bay	No	No	No
DVD capable	No	Inc 4xDVD	Inc 4xDVD
Weight	3.1 kg	3 kg	3 kg
Warranty	1 Year	1 Year	1 Year
DAA modem	Yes	Yes	Yes
With Windows 95/98 Rent	\$2,999 \$25.38/wk/3yrs* (90156)	\$3,790 \$32.07/wk/3yrs* (91260)	\$Call \$Call/wk/3yrs* (90157)

Satellite 2180CDT

The Satellite series is the ideal notebook for small and medium business, corporate projects and consumers providing the most CPU/Dollar from a major vendor without compromising features. This Satellite features an AMD 475MHz CPU, 64MB Ram, 4GB Hard Disk, Windows® 98, 12.1" Active Matrix TFT Screen, 56KB Modem in an all new case.



(90156)

\$3,029

Long Term Rent* T.A.P.** \$25.61 per week

Satellite Pro 4270XDVD



8MB VIDEO

DVD

The affordable high performance mobile computer. With a range of expansion capabilities, including optional Port Replicator for easy connection to desktop peripherals and accessories, Satellite Pro is the perfect, no-compromise solution for business professionals.

\$4,679

(94172)

Long Term Rent* T.A.P.** \$39.69 per week

*SS = Speed Step

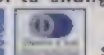
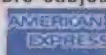
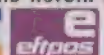
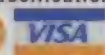
	Satellite Pro 4270XDVD	Satellite Pro 4280XDVD	Satellite Pro 4320XDVD
Processor	Celeron 500MHz	Pentium III 500MHz	Pentium III 600MHzSS*
RAM Std/Max	64/192 MB	64/192 MB	64/192 MB
Hard Disk	6GB	6GB	12GB
Screen	14.1" TFT	14.1" TFT	14.1" TFT
Display	1024 x 768	1024 x 768	1024 x 768
CD-ROM	Yes	Yes	Yes
Mic & Spkr	Yes	Yes	Yes
Port replicator	Optional	Optional	Optional
Select bay	No	No	No
DVD capable	Inc 6xDVD	Inc 6xDVD	Inc 6xDVD
Weight	3.1 kg	3.1 kg	3.1 kg
Warranty	1 Year	1 Year	1 Year
DAA modem	Yes	Yes	Yes
With Windows 95/98 Rent	\$4,679 \$39.69/wk/3yrs* (94172)	\$5,690 \$48.23/wk/3yrs* (90158)	\$Call \$Call/wk/3yrs* (94178)
With Windows 2000 Rent	\$4,879 \$41.30/wk/3yrs* (94173)	\$5,990 \$50.76/wk/3yrs* (94177)	\$Call \$Call/wk/3yrs* (94179)

MAY

10

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Finance methods subject to approval

TOSHIBA

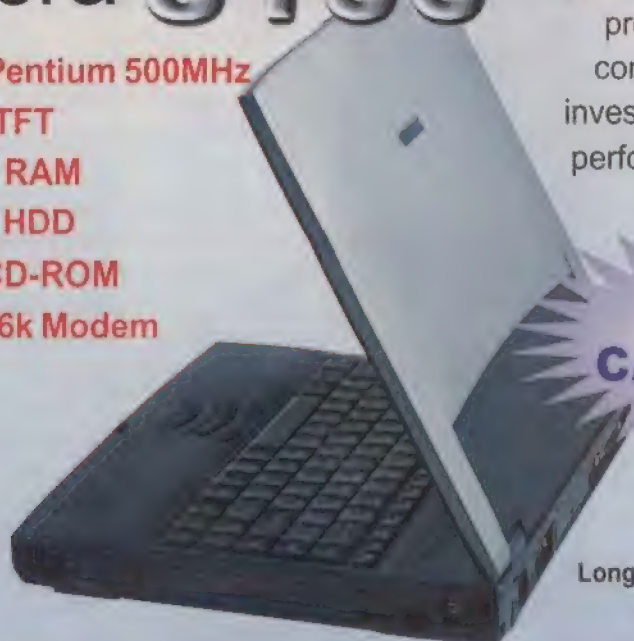
Web
Direct

www.ht.com.au/cat/toshiba

The Best Performance at the Best Price

Tecra 8100

- Intel Pentium 500MHz
- 14.1" TFT
- 64MB RAM
- 12GB HDD
- 24 x CD-ROM
- V.90/56k Modem



Styled for constant mobile performance, the Tecra 8100 series provides you with the ultimate combination of traditional Tecra investment benefits, high processor performance and a new sleek look and feel.

**DVD
CAPABLE**

From (94183)

\$6,995

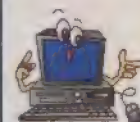
Long Term Rent* T.A.P.** **\$59.30** per week

Rental prices quoted are subject to change for GST.

Shop on the Web, from your home or office.

- Search on over 34,000 computer products
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Compare Tecra Models

	Tecra 8100	Tecra 8100	Tecra 8100	Tecra 8100
Processor	Celeron 500MHz	Pentium III 500MHz	Pentium III 600MHzSS*	Pentium III 650MHzSS*
RAM Std/Max	64 MB	64 MB	64 MB	128 MB
Hard Disk	6GB	12GB	12GB	18GB
Screen	14.1" TFT	14.1" TFT	14.1" TFT	14.1" TFT
CD-ROM	24x max.	24x max.	24x max.	24x max.
Mic/Speaker	Speakers	Speakers	Speakers	Speakers
Port replicator	Optional	Optional	Optional	Optional
Select bay	Yes	Yes	Yes	Yes
DVD	Capable	Capable	6 x DVD	6 x DVD
Weight	2.8 kg	2.8 kg	2.8 kg	2.8 kg
Warranty	3 Years	3 Years	3 Years	3 Years
DAA modem	Yes	Yes	Yes	Yes
With Windows 95/98 Rent	\$Call \$Call/wk/3yrs* (94180)	\$6,995 \$59.30/wk/3yrs* (94183)	\$7,859 \$66.46/wk/3yrs* (94185)	\$8,469 \$71.53/wk/3yrs* (94187)
With Windows NT 4.0 Rent	\$Call \$Call/wk/3yrs* (94181)	\$7,150 \$60.46/wk/3yrs* (94184)	\$7,990 \$67.61/wk/3yrs* (94186)	\$8,650 \$73.15/wk/3yrs* (94188)

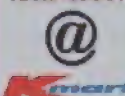
*SS = Speed Step

WINDOWS NT4.0/2000



Pentium® III available in some Tecra's

HARRIS TECHNOLOGY



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Toshiba Portégé

Check for
latest prices
& products

	Portégé 7200CT
Processor	Pentium III 600MHz SS*
RAM Std/Max	64/192 MB
Hard Disk	12GB
Screen	13.3" TFT
Display	1024 x768
CD-ROM	Optional
Mic & Spkr	Yes
Port replicator	Optional
Select bay	No
DVD capable	Yes
Weight	1.9 kg
Warranty	3 Years
DAA modem	Yes
With Windows 95/98 Rent	\$Call \$Call/wk/3yrs* (94170)
With Windows 2000 Rent	\$Call \$Call/wk/3yrs* (xxxxx)



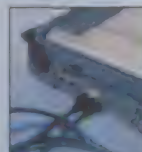
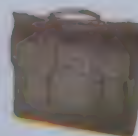
CUTTING EDGE PERFORMANCE

Leading the industry in ultra-portable performance, **Portege 7200CT** offers Intel's powerful Mobile Pentium® III 600MHz processor with Intel SpeedStep™ technology to speed through applications. At 25mm thin and only 2kg, **Portege 7200CT** packs unprecedented power into its slender charcoal grey and silver magnesium alloy case. Provides more than 2 hours battery life and up to four hours with an optional high-capacity battery pack further enhancing productivity whilst in transit.

The optional DVD Network Dock provides Networking, DVD playback, and Diskette Drive all in a slim docking station designed for the office or when travelling. Early adopters and travelling professionals will enjoy the freedom and flexibility of this featherweight computer with the power to perform. *SS = Speed Step

Options for Toshiba Notebooks

For more options see
Web Direct Link



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Broadway (Sydney)
Burwood (Melbourne)

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products are
in-store, but
consulting &
advise
available on
all items

TOSHIBA EDO Memory Upgrades

32MB for Tecra 8000 (not for PIII models)/	
Portégé7000/Satellite 4000	(29356) \$185
32MB for Portégé 3110	(81078) \$205
64MB for Tecra 8000 (not for PIII models)/	
Portege7000/Satellite4000	(29348) \$550
64MB for Portégé 3020	(77229) \$430

TOSHIBA Battery Packs

For Satellite 4000/4010/2520CDT & others	(21930) \$135
For Portégé 3010/3020 (Lithium Ion)	(73665) \$139
For Satellite 4000 Series	(72109) \$127
For Tecra 8000 (Lithium Ion)	(29358) \$278

TOSHIBA High Capacity Battery Packs

For Portégé 3010/3020	(72475) \$278
For Portégé 7000/7020	(66479) \$330

TOSHIBA Battery Charger

For Tecra 8000	(29357) \$435
----------------	----------------------

TOSHIBA Universal AC Adapter

For Tecra 8000/Satellite 4000/4010 & others	(44200) \$134
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TOSHIBA Additional 2 Year Warranty

For Satellites with TFT Display (21729)	\$182
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TOSHIBA Port Replicators

For Tecra II 750/780/8000	(79226) \$725
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TOSHIBA Desk Station V+

For Tecra 500/550/650/700/750/8000 Series	(25446) \$1,352
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Toshiba Friend Carry Bag	(75901) \$78
Leather Bag for A4 Notebooks	(68408) \$205
Classic Leather Notebook Carry Bag	(79770) \$207

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MAY

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IBM Desktops and Servers

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PC 300GL Pentium III

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- * 450MHz Model
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- * 10.1Gb Ultra ATA HDD with S.M.A.R.T. III
- * Microsoft Windows 98 2nd Edition (88786)

\$1,968Rent* T.A.P.** **\$21.23** /wk/3yrs

Rental Plan subject to approved purchases. Rental Figures shown are for 36 month terms

GST May apply to commitments made now - see page 2 for more details

CPU/MHz	HDD	RAM	CD/DVD	Modem	OS	Part #	Monitor	*Rent/week	Price
IBM PC300GL Workstation									
Pentium III 450MHz	10.1GB	64MB	No	No	Win98	(88786)	15"	21.23*	\$1,968
Pentium III 450MHz	10.1GB	64MB	No	No	Win98	(88789)	17"	18.69	\$2199
Pentium III 450MHz	10.1GB	64MB	No	No	Win98	(88790)	17" Pro	18.92	\$2,240

Many more configurations are available. Please call, or visit our website.

* RentSmart Rates are higher for equipment values of less than \$2000

IBM

Business
Partner

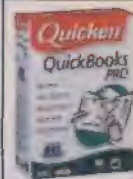
NetFinity 5000 Server

Offering powerful performance at an entry-level price, this versatile server sets the standard for e-business, small-to-medium business application and file serving, and large enterprise application serving. Available in tower or rack models, it features an integrated Advanced System Management processor and Netfinity Manager software for superior control.

- Pentium III 550MHz
- 128MB RAM standard
- Maximum storage capacity 91GB
- 512KB Level 2 Cache
- CD-ROM 32x max
- Dial-in for control/monitoring/remote management
- Ethernet Integrated Network Interface
- Slots and bays (total/available) PCI/ISA 5 (5) x 8 (6)

Model 86596RY
(81709)**\$5,328**Rent* T.A.P.** **\$45.23** /wk/3yrs

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on all items

Model XE2: C 450 - 64MB -

4.8GB - 12.1" TFT

From: (92922)

\$3,285



Model 900: PIII 500 -
64MB - 12GB - 13" XGA

From: (87325)

\$5,935

Model 4150: PIII650
- 128MB - 18GB - 14.1" XGA

From: (94684)

\$8,125



CPU/MHz	HDD	RAM	Screen	CD-ROM/DVD	Modem	OS	Part #	Rent/wk	Price
Omnibook XE2									
Celeron 450MHz	4.8GB	64MB	12.1" TFT	24xCD-Rom	56K	Win95/98	(92922)	\$27.92	\$3,285
Pentium III 500MHz	6.0GB	64MB	14.1" TFT	6xDVD	56K	Win95/98	(94683)	\$40.15	\$4,750
Omnibook 900									
Pentium III 500MHz	12GB	64MB	13" XGA	No	No	Win95/98	(87325)	\$50.30	\$5,935
Pentium III 500MHz	12GB	64MB	13" XGA	No	No	WinNT4	(87324)	\$51.92	\$6,125
Omnibook 4150									
Pentium III 650MHz	18GB	128MB	14.1" XGA	6xDVD	No	Win95/98	(94684)	\$68.76	\$8,125
Pentium III 650MHz	18GB	128MB	14.1" XGA	6xDVD	No	WinNT4	(94685)	\$70.38	\$8,319

T.A.P. - Based on 3 year term for business use. Rental prices subject to change for GST.

HP Jornada 680 Handheld

A convenient and versatile PC companion that's prepared for any journey. The HP Jornada 680 provides all the tools you need to manage your personal information while you're away.

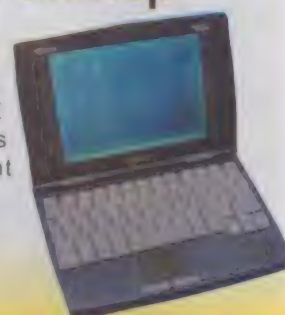
(77645) **\$1,545**



Jornada 820 Palmtop

8.2" VGA, 640 x480, 256 colour display. 190MHz, 16MB RAM, 16MB Burst Mode ROM, Windows CE 2.2, Pocket editions of Ms Word, Excel, Powerpoint Outlook, Internet Explorer.

(71162) **\$1,695**



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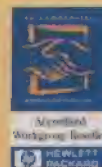


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HP Networks & Servers

HP PROCURVE



HP ProCurve 2224 Switch



Low-cost desktop switch ideal for delivering performance to workgroups with a mix of 10Mbps and 100Mbps devices and for migrating from 10Base-T to 100Base-TX:

- 24 10/100Base-TX autosensing ports
- One open transceiver slot
- Unmanaged
- Low, industry-leading price

(75515)

\$1,199

HP Procurve Switch 2424M



Desktop switch ideal for low-cost migration to 10/100 stackable switching:

- 24 10/100Base-TX autosensing ports
- Open module slot for Gigabit stacking and uplinks
- Managed
- Low industry-leading price

(75513)

\$2,499

HP ProCurve 4000M Switch



A feature-rich, modular 10/100/ Gigabit desktop switch that provides scalable, low-cost switching and all the benefits of HP Proactive Networking. Ideal for medium-to-large businesses looking for scalable, expandable, low-cost migration to 10/100/Gigabit switching to the desktop.

(66063)

\$4,590Optional Gigabit Module for
4000M (76563) **\$2,025**

HP ProCurve Switch 408

Unmanaged 8 port 10/100 switch in a compact sized package. This switch offers half/full duplex, 10/100 autosensing on every port.

Warranty :
Lifetime,
Exchange
Next Day
(79125)

\$519

NETSERVER E-60

HP E-60 - Pentium III 550MHz

- * PIII-550 with 512Kb Cache
- * Dual Processor Capable
- * 64MB 100MHz ECC SDRAM
- * RAM upgradeable to 1GB
- * Dual-Ch Ultra-Wide SCSI Controller
- * 9.1Gb SCSI Hard Disk
- * CD-ROM
- * PS/2 Keyboard and Mouse

(84911)

\$4,269
RentSmart \$36.23/Week*

HP E-60 - Pentium III 600MHz

- * PIII-600 with 512Kb Cache
- * Dual Processor Capable
- * 64MB 100MHz ECC SDRAM
- * RAM upgradeable to 1GB
- * Dual-Ch Ultra-Wide SCSI Controller
- * 9.1Gb SCSI Hard Disk
- * CD-ROM
- * PS/2 Keyboard and Mouse

(97336)

\$5,170
RentSmart \$43.84/Week*

*T.A.P. - Based on 3 year term for business use. Rental prices quoted are subject to change for GST

All systems include: 7 mass storage shelves (4 available after floppy, CD-ROM & 9GB disc), 6 expansion slots (5PCI, 1PCI/ISA combination), integrated 10/100 network interface, and HP TopTools for Servers Management Platform.

HP NetServers are ideal for all the small to medium businesses that demand the most out of their network server. So why trust your business to a generic box, when you could have the reliability and performance to troubleshoot, and at a price that is easy on your finances.

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With stability, quality and reliability, this easy-to-use notebook delivers beyond the latest key core technologies and value for money

Armada V300



Processor	C400MHz	C466MHz	C466MHz
RAM	64MB	64MB Standard	64MB
Hard Disk	4.3GB	4.3GB	4.3GB
Screen	12.1" CTFT	14.1" CTFT	14.1" CTFT
Display	800 x 600	1024 x 768	1024 x 768
CD-Rom	24x max	24x max	Optional
Battery Life	up to 3 hrs	up to 3 hrs	up to 3 hrs
DVD	Optional	Optional	4xDVD-Rom
Modem	56K	56K	56K
Warranty	1 year	1 year	1 year
Op System	Win 95/98	Win 95/98	Win 95/98
Rent 3 Yrs*	\$27.92	\$33.23	\$40.15
Inc Tax	\$3,299	\$3,920	\$4,745
Part Number	(88078)	(88134)	(88135)

Wine
on-line?



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Processor	PII366MHz	PII400MHz	PIII450MHz
RAM	64MB	64MB	64MB
Hard Disk	4.3GB	6GB	12GB
Screen	12.1" CTFT	14.1" CTFT	14.1" CTFT
Display	800 x 600	1024 x 768	1024 x 768
CD-Rom	24x max	24x max	24x max
Battery Life	up to 3 hrs	up to 3 hrs	up to 3 hrs
DVD	Optional	Optional	Optional
Modem	56K	56K	56K
Warranty	1 year	1 year	1 year
Op System	Win 95/98	Win 95/98	Win 95/98
Rent 3 Yrs*	\$30.92	\$38.77	\$45.00
Inc Tax	\$3,639	\$4,583	\$5,315
Part Number	(90080)	(90082)	(94879)

Armada E500



*Rental rate for business use, includes stamp duty and FID for NSW. T.A.P. Rental prices quoted are subject to change for GST.

GST May apply to commitments made now! See page 2 for details.

Armada M700



Processor	PII366MHz	PII400MHz	PII400MHz
RAM	64MB	64MB	64MB
Hard Disk	6.4GB	10GB	10GB
Screen	13.3" CTFT	14.1" CTFT	14.1" CTFT
Display	1024 x 768	1024 x 768	1024 x 768
CD-Rom	24x max	Optional	Optional
Battery Life	up to 3 hrs	up to 3 hrs	up to 3 hrs
DVD	Optional	4xDVD-Rom	4xDVD-Rom
Modem	56K	56K	56K
Warranty	1 year	1 year	1 year
Op System	Win NT4	Win 95/98	Win NT4
Rent 3 Yrs*	\$44.76	\$56.53	\$58.85
Inc Tax	\$5,289	\$6,690	\$6,949
Part Number	(87039)	(80338)	(80339)

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Acer TravelMate Notebook Series

*The Perfect combination of
connectivity, portability and
design elements.*



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Model	341T CD	341T DVD	732TX
Screen	12.1" TFT	12.1" TFT	14.1" TFT
CPU	PIII 500MHz	PIII 500MHz	PIII 500MHz
Memory	64MB	64MB	64MB
HDD	6GB	6GB	9GB
CD-ROM	24xCD	NO	24xCD
DVD	NO	2xDVD	NO
Fax/Modem	56Kbps	56Kbps	56Kbps
LAN Card	10/100 LAN	10/100 LAN	10/100 LAN
Op. system	Windows® 98	Windows® 98	Windows® 98
Part number	(94817)	(94818)	(94822)
RentSmart*	\$42.23/week	\$45.69/week	\$50.76/week
Price	\$4,995	\$5,395	\$5,995



*RentSmart
The figures
shown are
based on a per
week basis
over
3 years.
To approved
persons, Terms
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Refer to Page 2
for more
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*Metropolitan areas only.

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See page 4 for more
information on BizSmart.
(BizSmart only available with
TM514T & TM514TXV)

Model	507DX	514T	514TXV
Screen	12.1" HPA	12.1" TFT	14.1" TFT
CPU	Celeron® 466MHz	Celeron® 466MHz	Celeron® 466MHz
Memory	32MB	64MB	64MB
HDD	4.8GB	4.8GB	6.0GB
CD-ROM	24xCD	24xCD	NO
DVD	NO	NO	2xDVD
Fax/Modem	56Kbps	56Kbps	56Kbps
LAN Card	NO	NO	NO
Op. system	Windows® 98	Windows® 98	Windows® 98
Part number	(94819)	(94820)	(94821)
RentSmart*	\$22.84/week	\$26.30/week	\$37.15/week
Price	\$2,695	\$3,095	\$4,395

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ThinkPad i Series

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- * Intel Celeron 466MHz
- * 64Mb SDRAM Standard Upgradable to 256Mb
- * 9Gb Hard Disk Drive
- * CD-ROM 24Xmax-10Xmin
- * ATI Rage mobility M 128-bit 2.5MB SDRAM AGP 2x
- * 14.1" TFT (Active Matrix) Screen

With the new, sleeker ThinkPad® i Series notebook, you'll stay productive wherever you go, in style. **Exceptional ThinkPad i Series design** combines a high-performance Intel® processor, large, bright display, integrated modem and the innovative new **ThinkLight™** (on select models) for illuminating your keyboard so you can keep working. The ThinkPad i Series notebook is also **easier than ever to use**. **Easy Launch buttons** and the **Media Center** put control at your fingertips. **innovations for improved ease of use**

- **ThinkLight** illuminates your keyboard for working in low-light conditions (on select models)
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- Keyboard with full-sized keys and an ergonomic palm rest for easy, comfortable typing
- TrackPoint® pointing device, including "Press-to-Select" feature, helps speed program launches and reduce keystrokes

Model 26214CM (94421)

\$3,895

Rent* T.A.P.** for **\$33.00**
per week over 3 years

Other ThinkPads available

CPU/MHz	HDD	RAM	Screen	CD-ROM/DVD	Modem	OS	Part #	Rent/wk	Price
ThinkPad iSeries									
Celeron 466Mhz	9GB	64MB	14.1" HPA	CD-Rom	56K	Win98SE	(94421)	\$33.00	\$3,895
Pentium III 500Mhz	6GB	64MB	15" TFT	DVD	56K	Win98SE	(92155)	\$42.23	\$4,995
ThinkPad 390X Series									
Pentium III 450Mhz	12GB	64MB	14.1" TFT	CD-Rom	56K	Win98	(88823)	\$47.76	\$5,639
Pentium III 450Mhz	12GB	64MB	14.1" TFT	CD-Rom	56K	Win NT4	(88799)	\$48.46	\$5,735
ThinkPad 600 Series									
Pentium III 450Mhz	6GB	64MB	13.3" TFT	CD-Rom	56K	Win98	(92156)	\$50.30	\$5,270
Pentium III 500Mhz	12GB	64MB	13.3" TFT	DVD-Rom	56K	Win98	(92158)	\$63.92	\$7,550
Pentium III 500Mhz	12GB	64MB	13.3" TFT	CD-Rom	56K	Win NT4	(92160)	\$61.38	\$7,259

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T.A.P. - Based on 3 year term for business use. Rental prices subject to change for GST.

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Compucon 15" LCD Flat Panel monitor
\$2,249
(82144)

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Options

RAM upgrade to 64MB (28264)

\$42

RAM upgrade to 128MB (73256)

\$177

Hard Drive Upgrade to 13GB Ultra DMA (80042)

\$67

CD-ROM 48x Internal IDE (89109)

\$102

10x Internal DVD-ROM and software DVD Player (94927)

\$250

Compucon AMD

Compucon AMD unit with the following:

- AMD K6-2 450MHz Processor
- 6.4GB Ultra DMA 66Hard Disk Drive
- 32MB PC100 SDRAM
- 4MB AGP Graphics Card (ATI Rage IIc)
- 1 x AGP, 4 x PCI and 3 x ISA Slots
- 2 Serial, 1 Parallel & 2 USB Ports

- PS/2 Wheel Mouse
- Windows 95 or 98
- PS/2 104-key Keyboard
- Midi-Tower Case
- 1.44 Floppy Disk Drive
- 10MB Combo Network Card
- 3 Years On-Site Warranty

(89089)

\$1,199

This system with 15" Compucon Multimedia Monitor:

\$1,529

Monitor price is **\$330** (25874)

Intel Celeron

Compucon Celeron unit with the following:

- Intel Celeron 500MHz Processor
- 6.4GB Hard Disk Drive
- 32MB SDRAM
- 4MB AGP Graphics Card (ATI Rage)
- 1x AGP, 3x PCI and 1x ISA Slots
- 2 Serial, 1 Parallel & 2 USB Ports

- PS/2 Wheel Mouse
- Windows 95 or 98
- PS/2 104-key Keyboard
- 10MB Combo Network Card
- Midi-Tower Case
- 1.44 Floppy Disk Drive
- 3 Years On-Site Warranty

(94882)

\$1,259

This system with 15" Compucon Multimedia Monitor:

\$1,589

Monitor price is **\$330** (25874)

Intel Pentium III

Compucon Pentium unit with the following:

- Intel Pentium III 600MHz Processor
- 6.4GB Hard Disk Drive
- 32MB SDRAM
- 4MB AGP Graphics Card (ATI Rage)
- 1x AGP, 4x PCI and 3x ISA Slots
- 2 Serial, 1 Parallel & 2 USB Ports

- PS/2 Wheel Mouse
- Windows 95 or 98
- PS/2 104-key Keyboard
- 10MB Combo Network Card
- Midi-Tower Case
- 1.44 Floppy Disk Drive
- 3 Years On-Site Warranty

(94892)

\$1,699

This system with 17" Compucon Multimedia Monitor:

\$2,168

Monitor price is **\$469** (25906)

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The SGI Internet Server is optimised to provide high performance on the Linux Operating System

Rental Plan subject to Approved purchasers. Rental figures shown are for 36 month terms.

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Sleek Internet Servers with Power

SGI Internet Server for Linux

Plug, Power & Provide for only \$80.30/wk*

- * Pre-loaded solution for medium business Intranets and Internets
- * Pre-built ready to serve!
- * Combines the convenience of an appliance with the flexibility of an open system
- * Everything you need pre-installed in one complete package:
 - Apache Web-Server
 - Security software
 - Performance monitoring software
 - Red Hat® Linux 6.1
 - ProPack 1.2 for Linux
- * All running on SGI's new high-performance SGI1200 Server
- * Fully supported through SGI Global Support



SGI Internet Server package from:

\$9,499

Rent * T.A.P.** per week over 3 years: **\$80.30**

SGI Internet Server Designed for ISPs, ASPs, and co-location facilities, the Linux® OS-based SGI Internet Server is a cost-effective, completely integrated, thin serving solution, which provides quick installation and deployment for these high-growth environments.

SGI Internet Server Features and Benefits:

- * Low entry cost
- * Thin (2U) form factor for more units per rack
- * Reliable Linux operating system
- * Preinstalled, fully supported tools and applications for quick deployment, easy monitoring, and remote administration
- * Lights-out-management
- * Security lockdown and intrusion detection software
- * Web-base tools to streamline installation, troubleshooting, and networking
- * High-performance integrated basic services for Web serving and messaging
- * Preinstalled Apache Web Server software plus SGI performance enhancements
- * Single-point-of-call support with SGI's industry leading global support
- * A solid foundation for applications such as Web hosting, E-commerce, messaging and media serving

SGI 1400 Server for Windows and Linux

Scalable server that exceeds requirements for certification by Microsoft's worldwide hardware quality lab



Quad Processor Capable

- 1 to 4x 550MHz Pentium III Xeon Processors
- 256MB ECC Memory (max 4GB)
- 9GB Ultra 2 SCSI Disk
- Windows NT 4.0 Server or Linux (optionally available)
- 6x Ultra2 SCSI hot-swap drive bays
- 7x PCI slots on 2 buses
- 19 Inch rack-mountable (optional kit required)
- High availability features: hot-pluggable disk drives, emergency management port, visual indicators for component health, redundant fan and power supplies, ECC memory
- Robust management and monitoring options, including Intel server control and SNMP support
- 1 Year Warranty (3 Year Option available)

\$15,995

SGI 1400 from:

Rent * T.A.P.** per week over 3 years: **\$135.23**

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NEW Visual Workstations from SGI



Introducing the **Silicon Graphics 230** visual workstation, the first of a new line of visual workstations from SGI. This new family delivers the best of SGI graphics capabilities in a completely compatible and standard **Intel-based** platform that once again sets a new bar for price/performance.

*These new systems give technical and creative professionals a solution that best supports the most demanding applications, ranging from **Windows** based applications to **Linux** solutions.*

Silicon Graphics 230 Visual Workstation

Base System features:

- 1 x 667MHz Pentium III Processor
- 133MHz System Bus
- Silicon Graphics V3 32MB DDR Graphics Card
- 128MB ECC 133MHz Memory (1.5GB max)
- CD-ROM, 1.44MB Floppy Drive
- Red Hat® Linux 6.1 or Windows NT4.0
- 20GB IDE Disk Drive
- 5 x PCI slots
- 3 x 3 1/2" internal drive bays, 3 x 5 1/4" external
- Single-channel 10/100 Base-T Ethernet
- 3 Year Warranty (1 year On-Site)

Key Graphics Features of the Silicon Graphics 230:

- * AGP 4x with Fast Writes
- * Integrated Transform and Lighting
- * 256-bit QuadPipe Rendering Engine
- * 256-bit 2D Rendering Engine
- * High-Speed Memory Interface with DDR memory

**ALSO
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Silicon Graphics 230 Visual
Workstations start from:

\$5,999

(Monitor Extra)

Rent * T.A.P.** per week over 3 years: **\$44.31**

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17.3"

Silicon Graphics 1600SW Flat Panel Monitor

You'll never look at a monitor the same way again.

High resolution 17.3" 1600x1024 LCD monitor. 16.7 million colours (24-bit true colour; no dithering). Unique SuperWide screen displays two full pages. Supports ColorLock colour calibration. Ultrafine dot pitch (0.23mm) for professional quality image editing (110dpi). Fast pixel response for video playback. Dimensions incl. base: 17.8"W x 18.3" H x 7.3" D, 7.2Kg.

With 32MB Revolution IV PCI
Graphics Card:

(75447)

\$5,843

Rent* T.A.P.** **\$49.38**/wk/3yrs

With 32MB Revolution IV AGP
Graphics Card:

(75448)

\$5,843

Rent* T.A.P.** **\$49.38**/wk/3yrs

**MAY
21**

Multi-Server Controllers

Control up to 256 network servers with a single monitor, keyboard & mouse

3 Year Warranty

With a ServerLink KVM switch you can monitor and fully control up to 256 network servers with just one monitor, keyboard and mouse. Save money on expensive monitors, create more working space and cut down on your power costs. Designed and manufactured in Australia by an award winning engineering company, ServerLink is packed with features, providing total control of your ever expanding network.



From **\$375**

- Select servers via On-Screen-Display or Front Panel
- Name servers for simple selection
- Mouse & keyboard emulation for flawless booting
- Scan Mode for periodic server monitoring
- Standard cables used throughout
- Cascadeable to control up to 256 servers
- 8 and 16 port models 19 inch rack mounted design
- Australian designed and manufactured

ServerLink™

- EPROM upgradeable for future technology
- Supports PS/2 and Serial mouse emulation

SL-401E	4 Port ServerLink Controller for PS/2 only	(71652) \$375
SL-401	4 Port ServerLink Controller	(63724) \$795
SL-801	8 Port ServerLink Controller	(63777) \$1345
SL-1601	16 Port ServerLink Controller	(63778) \$2250



SERVERLINK INFINITY

PS-2 ONLY

- Flash ROM upgradeable for future technology
- Password protection for security

SL-821	8 Port ServerLink Infinity controller	(97888) \$1170
SL-821-P	8 Port ServerLink Infinity controller includes 8x2 metre Cables	(97889) \$1335
SL-1621	16 Port ServerLink Infinity controller	(97890) \$1929
SL-1621-P	16 Port ServerLink Infinity controller includes 16x2 metre Cables	(97891) \$2285



NEW SERIES

ServerLink to computer cable

Each end of the cable fans out into three connectors.

2m cable for PS/2 mouse, keyboard and monitor (63972)

\$29

5m cable (63976)

\$79

2m cable for AT/Serial mouse, keyboard and monitor (63974)

\$29

5m cable (63977)

\$79



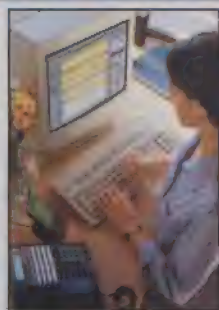
MAY 22

Palm™**Fly Buys.**

*Bonus points on parts 81158,
95059 & 95061 valid from
20 April 00 to 31 May 00

**Web
Direct**www.ht.com.au/cat/palmCheck for
latest prices
& products

Connected Organisers



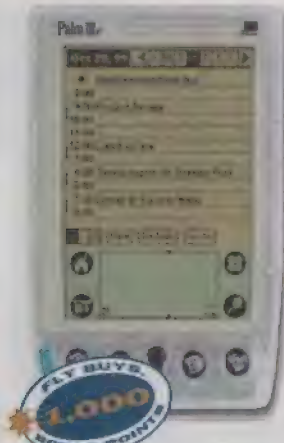
Excellent Palm™ Computing from Harris Technology

Palm™ connected organisers manage life's little details. It will help you stay on top of things everywhere you go. You can store thousands - literally thousands - of names, addresses, phone numbers, to-do's, and expenses, plus hundreds of e-mail messages. You can synchronise all your information with your computer at the touch of a button. More features: Infrared communication. Access your e-mail with the Palm Modem® accessory. Applications: Date Book, Address Book, Mail, To-do List, Memo Pad, Expense, Calculator, Security, Games, HotSync®.



Palm IIIe™

Connected Organiser
One Touch Organisation



Imagine having your daily schedule, important phone numbers, lists, meeting times and more in one organised place. It's easy and affordable with a new Palm IIIe™ connected organiser. And, at just 12cm tall and a mere 170g., it can go wherever you go - be it work, home, school or on vacation. Say goodbye to your bulky paper planner. The Palm IIIe™ connected organiser is an easy-to-use, pocket-sized way to keep track of your busy life. Choose from thousands of add-on applications. Internet ready. HotSync® cradle included. Stores approximately:

- 6,000 addresses
- 5 years of appointments
- 1,500 to-do items
- 1,500 memos
- 200 e-mail messages
- and lots of third-party applications.

\$285

(81158)

1000 Bonus Fly Buys points *

Palm IIIc™

Connected Organiser
Colorful



The Palm IIIc™ combines functionality and speed with advanced screen technology that renders a vivid, clear colour display. A rechargeable lithium ion battery lasts more than two weeks with normal use, and recharges in your HotSync® cradle in just minutes a day. An optional recharger kit is great when you're away from your PC. Stores approximately: • 10,000 addresses • 5 years of appointments • 3,000 to-do items • 3,000 memos • 400 e-mail messages • and lots of third-party applications.

\$845

(95059)

1000 Bonus Fly Buys points *

Palm™

Portable Keyboard

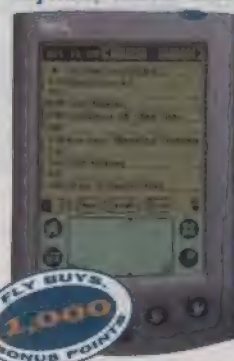
Tri-fold Keyboard Goes
Anywhere!



Anywhere!

Palm Vx™

Connected Organiser
Slim, stylish, more storage



If you're looking for the sleekest device on the market, look no further than the Palm Vx™ organiser. Weighing in at just 114 grams, it has the same anodised aluminum exterior and LCD screen as the Palm V™ organiser. Yet it has four times the memory of its predecessor, giving you more speed and more storage.

Stores approximately: • 10,000 addresses • 5 years of appointments • 3,000 to-do items • 3,000 memos • 400 e-mail messages • and lots of third-party applications.

\$687

(95061)

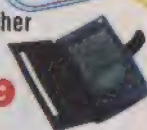
1000 Bonus Fly Buys points *

Leave your laptop in the office. Carry this pocket-sized keyboard to take notes at your next meeting or write reports on an airplane. Folds down small. Weighing in at less than 250 grams, this full-size keyboard tri-folds into a size just slightly bigger than a Palm™ organiser itself. Unfolded, it's the same size as your desktop keyboard. No batteries required.

\$225

(87210)

Palm Slim Leather Case

(63801) **\$49**

Palm III 3-pack Styli

(60675) **\$19**

Palm III Cradle

(60673) **\$60**

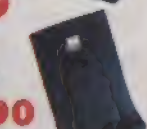
Palm V Cradle

(74669) **\$112**

Palm V Leather Belt Clip Case

(74673) **\$49**

Palm V Modem

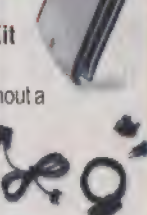
(74668) **\$290**

Palm V Hard Case

(74676) **\$75**

Palm V Travel Kit

For charging and synchronising without a cradle. HotSync cradle, plug adapters and AC charger

(74677) **\$110**

Palm III series PalmGlove

Shock-absorbent, water-resistant neoprene. Black:

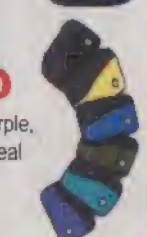
(82231) **\$50**

Also available: purple, olive, royal blue, teal and yellow



Palm III series Colour Shades

This fun pack contains 3 translucent flip covers in blue, lime & aqua + 3 black plastic styli.

(82253) **\$25****MAY
23**

Sales: 1300 13 9999
Fax: 1300 13 6666

Website:
E-mail:

www.ht.com.au
sales@ht.com.au

**Delivery
Australia-Wide**

APC®

AMERICAN POWER CONVERSION

HARRIS TECHNOLOGY @ Kmart

Broadway (Sydney) and Burwood (Melbourne)

Web Direct

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Power Back Up = Power Protection

APC PowerStack Power Protection® For hubs, switches, routers

Smart battery backup and high performance surge suppression for Windows 95 & NT PCs



- PowerChute® Plus software lets your UPS shut down your applications gracefully in the event of an extended power failure
- Additional outlet for protection of printers
- Audible alarms
- Phone/modem protection
- User replaceable, hot swappable batteries

APC Back-UPS Pro 280si (76636) **\$290**

APC Back-UPS Pro 420si (76637) **\$392**

APC Back-UPS Pro 650si (76638) **\$527**

Fly Buys.

Want **Fly Buys** with that? Call Harris Technology for more information

APC Smart-UPS®

Harris Technology now offers Fly Buys! For small office servers

The Industry's First 5 kVA 5U Rack-Mount UPS Designed for High-Powered and MultiServer Environments

2 Smart-Slots that work all APC accessories and PowerChute Plus. Built-in Manageability. The Web/SNMP card is pre-installed. This makes the UPS manageable via telnet, SNMP and Web Browser. Hot-swappable and user-replaceable batteries (for minimum downtime for mission critical applications)



APC Smart-UPS 5000 (92487) **\$5728**

See the APC Web based sizing guide to help you select the appropriate UPS: www.apcc.com



Back-Ups for PC's!

300va (56229)

\$199

500va (56230)

\$245

650va (56231)

\$298



APC

Symmetra

Power Array
8kVA, exp. to
16kVA

\$14,990

(71087)

So good we use it ourselves!

APC PowerStack Power Protection® For hubs, switches, routers

Symmetra Power Array-
For Data Centers.



For data centers and high availability. The APC Symmetra provides the four most critical elements of total data center protection: redundancy, scalability, manageability and serviceability.

APC PowerStack 250 (78992) **\$499**

APC PowerStack 450 (78991) **\$619**

HARRIS TECHNOLOGY™

Pricing** and specifications herein are subject to change without notice.



Finance methods
subject to approval

MAY
24



Smart Storage Solutions

Check for latest prices & products



Collect 1000 bonus Fly Buys points when you purchase the marked products (82633, 82780, 74450, 74451). *Offer valid 20/04/00-31/05/00

Zip 250MB USB



Provides high-capacity storage in an easy-to-use format that can go from desktop to laptop quickly and reliably. Sleek new design. Connect via USB port or through PCMCIA card version which requires no additional power cables. Backward compatible with 100MB Zip media

(82633) **\$329**

Drive USB/PC Card Combo:
(82780) **\$385**

* Collect 1000 bonus Fly Buys points when you purchase these products (82633, 82780)

ZIP Zip 250MB



Portable, light, easy to use and holds more files than ever before! Backwards compatible with 100MB Zip disks. Comes with 1 Zip 250MB disk. Iomega tools supplied on CD.

Parallel (74450) **\$289**

SCSI (74451) **\$289**

Disks:

Single (74454) **\$35**

10-pack (74452) **\$315**

* Collect 1000 bonus Fly Buys points when you purchase these products (74450, 74451)

Special Offer

DISASTER FREE PROMO

Buy any Iomega Zip, Jaz, Klik! or ZIP CD drive, and call to claim your **FREE** copy of Norton Utilities 2000! This great software, valued at around \$100 works in conjunction with your Iomega drive to keep your data safe. Valid for items purchased between the 1st March and 31st May 2000

Iomega + Norton Utilities = Safely
For more information contact the Iomega promotion line - Australia 1 300 360 947

JAZ

Jaz 2GB External



\$639

(78941)

The external Jaz 2GB drive is faster than many hard drives, has a full 2GB of storage space in each removable disk, gives you the freedom to take your files with you, and is backward compatible with industry standard Jaz 1GB disks. Does not include Jaz disk.

Disk single (61652) **\$180**

Disks 3-pack (57271) **\$534**

CLIK!

Klik! PC Card Drive



Integrated, high-capacity removable solution for notebook users. Sleek & compact, fits into most notebooks. Store, protect and share important information on a 40MB Klik! disk (not included).

Klik! Drive Bundle (75501) **\$230**

Klik! Drive PC Card (78902) **\$260**

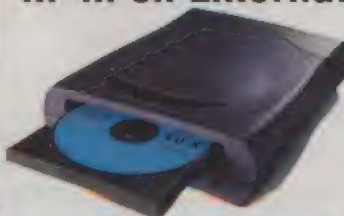
Klik! Drive Mobile (76743) **\$310**

Klik! disks 2-pack (75984) **\$65**

Klik! disks 10-pack (75985) **\$160**

ZIPCD

4x 4x 6x External



The ZipCD* external Universal Serial Bus (USB) CD-ReWritable (CD-RW) drive enables you to record, create, share and archive up to 650Mb of data on a common CD format. Iomega's ZipCD drives are high-capacity, easy-to-use and ideal for saving and sharing original music, personal photos, games, internet content and more. The ZipCD* 4x4x6 external USB drive offers an innovative external design and complements Iomega's ZipCD 4x4x24 internal drive providing you with a choice of optical storage methods

(92623) **\$545**

Zip 100MB disk:

(23772) **\$19**

10-pack:
(21889) **\$185**

Zip PCMCIA SCSI accelerator card
(35145) **\$175**

Zip ISA SCSI Zoom accelerator card
(21888) **\$50**

Zip drive carry case
(31823) **\$50**

Zip parallel cable
(46305) **\$40**

Zip SCSI cable
(46304) **\$40**

Zip disk labels 20-pack (48059) **\$4**

Zip 6-disk wallet
(35146) **\$25**

Jaz 1GB disk
(24218) **\$170**

3-pack
(32844) **\$465**

Jaz PCMCIA SCSI card
(44744) **\$199**

Jaz universal power supply
(35154) **\$60**

Klik! Power Supply
(78925) **\$29**

See www.ht.com.au/cat/iomega for more info on these products

Sales: 1300 13 9999
Fax: 1300 13 6666

Website: www.ht.com.au
E-mail: sales@ht.com.au

See Page 2 for Locations

Cost-effective Connectivity Solutions

RT 338 ISDN Router

Latest technology with ease-of-use designs

Compatible with all major Internet ISDN equipment, this is the ideal router for Internet access, LAN-to-LAN connection, and remote access for a single user, small business or branch office over ISDN. Includes auto sensing input 10/100 network port & caller ID on phone ports.



(97718)

\$879

RT 311 Cable/DSL Internet Gateway

Connect multiple PCs to share single IP address

The NETGEAR RT311 provides NAT service that allows up to 32 users on your 10/100 network to share the high-speed Internet connection. At the same time it also provides firewall protection to guard your network against hackers and unauthorised access from the Internet.



(97719)

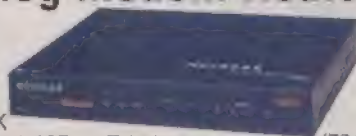
\$699

RRP

RM 356 Analog Modem Router

Connect multiple PCs to the Internet easily

Router + integrated 56K modem + integrated 4-port 10BaseT hub • DHCP server • Dynamic NAT+ • Dial-on-Demand-routing • Hi/fn (STAC LZS) compression • 5 year warranty



(70197)

\$558

RT 328 ISDN Router

Home office Internet access in a box

Includes built-in ISDN TA, 128 MultiLink PPP, DHCP Server, Dynamic NAT+, Dial-on-Demand Routing. Provides Internet access, LAN-to-LAN intranet connection, and remote access for a single user, a small business, or a branch office over ISDN.



(68900)

\$675

Are you running out of space?



Add extra Hard Drive capacity to your network with NETGEAR Network Disk Drives!

ND 508

8GB

(79013)

\$998

ND 520

20GB

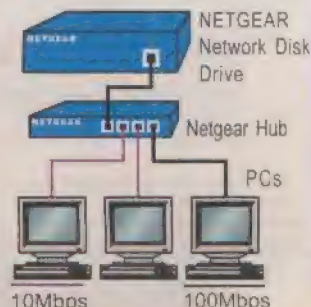
(79014)

\$1,635

NETGEAR Network Disk Drives are the first information appliances to use high speed networking technology to simplify the use and installation of storage space on the network.

By using a high speed network instead of adding internal hard drives you can add disk capacity for storing customer files, pictures, applications or any other data quickly & easily.

• No hassle of adding internal hard drives • One-step installation on your PC - no complicated server setup or hardware installation required • Provides performance close to that of an internal hard drive • Microsoft, Unix, Novell compatible



Gigabit Switches

The FS509 and FS518 high-performance Fast Ethernet Gigabit switches provide a cost effective way to instantaneously boost network performance. Secure the power of Gigabit Ethernet to speed up server and backbone access. Automatic speed & full/half duplex sensing.

FS 509

(76840)

\$1,689

Eight switched 10/100Mbps ports + one 1000Mbps port (Gigabit Ethernet uplink)

FS 518

(81514)

\$2,665

Sixteen switched 10/100Mbps ports + two 1000Mbps ports (Gigabit E'net uplink)

GS 504

(81515)

\$2,945

Four full-duplex Gigabit fiber ports

Netgear offers free, 24-hour phone support



The GS504 Gigabit Fibre Switch is a high performance network switch that provides back-bone connectivity for power work-groups, data centers, and server farms.



Fly Buys.

Collect Fly Buys points on your computer hardware & software when you purchase from Harris Technology.

MAY 26

Take the Work out of Networking

Delivery
Australia-wide

10/100Mbps Fast Ethernet Switches

The NETGEAR FS105 and FS108 feature 5 or 8 switched 10/100 Mbps ports, auto-speed and duplex mode sensing. Versatile and compatible. Compact and easy to install. Vista jacks with built-in LEDs.



FS 105 5-port Autosensing (84722) **\$289**

FS 108 8-port Autosensing (70905) **\$450**



The NETGEAR FS516 & FS524 switches provide powerful, network center

performance with all 16 or 24 ports capable of 10 or 100 Mbps, half- or full-duplex operation, automatic speed sensing. Ideal for segmenting networks into small, connected subnets. Vista network ports with built-in LEDs.

FS 516 16-port Autosensing (60522) **\$1,155**

FS 524 24-port Autosensing (77549) **\$1,350**

10Mbps Ethernet Hubs



Vista jacks with built-in LED indicators • Uplink port for network expansion • Slim, sturdy metal case design • BNC/AUI backbone support option • Limited lifetime warranty • Easy plug and play installation

EN 104TP 4-port Slimline (53456) **\$75**

EN 108TP 8-port Slimline (53458) **\$115**

EN 116 16-port Slimline (53459) **\$220**

EN 516 16-port Rackmount (17425) **\$237**

EN 524 24-port Rackmount (17435) **\$319**

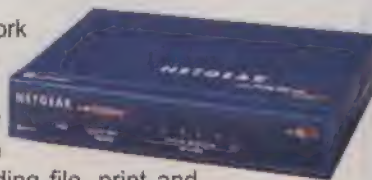


- 16 or 24 10BASE-T ports
- Easy plug and play installation
- Vista network port with built-in LEDs
- BNC/AUI backbone support
- Internal power supply

Printer Servers

The NETGEAR print servers let you share any parallel printer among all users on the network without having to dedicate a PC for print serving and without complex setup and configuration. These print servers connect directly to the network and can be placed anywhere convenient to the users.

With a built-in network 4 port hub, the PS105 is an all-in-one connectivity solution for the SOHO users- providing file, print and resource sharing as well as network gaming.



PS 105 10Mbps Print Server (67225) **\$235**



The PS110 attaches to a 10 or 100Mbps hub or switch, providing effortless transition from Ethernet to Fast Ethernet. It also supports 2 parallel printers.

PS 110 10/100Mbps Print Server (67226) **\$285**

10/100 Dual Speed Hubs

These Netgear hubs connect multiple PCs to share printers, files, Internet access and e-mail communications. Mix & match 10 and 100Mbps PCs, servers and peripherals on the same network with ease and without the high cost and complexity of multiple hubs and bridges. All feature easy, plug and play installation, auto-sensing dual speed ports and vista network ports with built-in LEDs.



DS 104 4-port Slimline (70795) **\$170**

DS 108 8-port Slimline (18755) **\$279**

DS 116 16-port Slimline (81519) **\$499**

DS 524 24-port Stackable (69474) **\$925**

Stack up to 8 hubs via provided cascade cables. Includes rack-mount kit. Plug and play installation.



NETGEAR

Ethernet
Adapter 10/
100 PCI



(53460)

\$55

PCMCIA
10/100 Mbps
Network Card



(60071)

\$165

USB
10 Mbps NIC



(81289)

\$99

Netgear offers
free, 24-hour
phone support

Fly Buys.

Want **Fly Buys**
with that?
Call Harris
Technology for
details

MAY

27



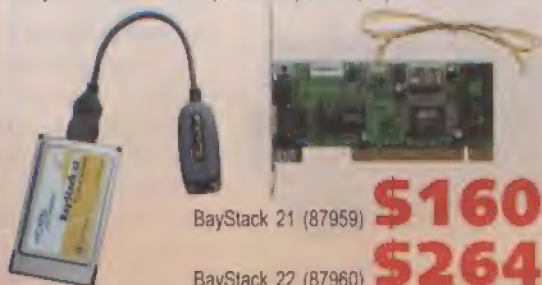
BayStack- Think Big, Start Small

NETWORK INTERFACE CARDS

NORTEL NETWORKS BayStack 21&22 PCI and PCCard 10/100 Ethernet Adapters

The BayStack 21 and 22 Network Interface Cards (Ethernet Adapters) provide affordable and reliable connectivity to complete your Ethernet computer networking solution. Perfect for customers that like to minimise possible compatibility issues by using equipment from one vendor, or who demand the high performance and stability renowned with Nortel Networks.

- Enterprise-class quality and reliability
- 10/100 Autosensing, full and half-duplex support
- Plug-and-play installation
- Extensive network and PC operating system support
- WiM and WoL support
- BayStack 21 PCI card for desktops and servers
- BayStack 22 PCCard (PCMCIA) for Laptops



BayStack 21 (87959)

\$160

BayStack 22 (87960)

\$264

MANAGED HUB

NORTEL NETWORKS BayStack 253 10/100 Autosensing Hub



High-performance and flexible Ethernet connectivity for power workgroups. Full support for 10/100 autosensing on all ports, enabling seamless migration from 10 Mbps to 100 Mbps connections.

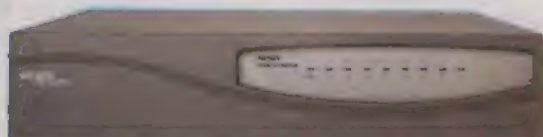
- Highly Affordable - Web-based network management
- Built-in two-port switch - Easy stackability
- High-speed fiber MDA Available - Fail-Safe features
- Real time hub status at a glance - Advanced analysis and monitoring with RMON and StackProbe

253: 24 ports 10/100 BaseTX

\$3,120

INTERNET & REMOTE ACCESS

NORTEL NETWORKS BayStack Instant Internet 100 Instant Internet access for your office



BayStack Instant Internet is an affordable, easy to install, secure solution for connecting an entire PC LAN to the Internet. All the hardware and software you need is included in the BayStack Instant Internet package, and an entire LAN can be connected to the Internet in minutes. You can avoid virtually all of the nagging network problems that result from connecting your organization's LAN to the Internet. BayStack Instant Internet provides low access cost, user access controls and a totally secure network environment. But best of all, it's easy to install and use.

- Management tools for employee accountability
- Easy installation and Maintenance
- Virtual Private Network (VPN) Support
- Your choice of connectivity options
- Support IP, IPX and mixed environments
- Built-in rock-solid firewall security

(97721)

Instant Internet 100

\$1,445

NORTEL NETWORKS BayStack 820 ISDN Router Cost-Effective ISDN Router for Small-Business



A key addition to the BayStack product family, the BayStack 820 ISDN Router offers a affordable, scalable, high-performance solution, with standards-compliant interoperability with products from third-party vendors. It provides connectivity for branch offices and/or remote users (telecommuters) into the central corporate site or out to the Internet and is ideally suited for growing businesses.

- Provides office to office connectivity supporting IP and IPX routing
- Remote access capability via BRI ISDN
- Easy setup, Configuration and Management
- MultiLink PPP
- Bandwidth on demand
- Integrated 4 port 10BASE-T hub, 2 POTS ports
- Built in DHCP server

(97567)

BayStack 820

\$1055

Scalable Data and Internet Solutions

UNMANAGED SWITCHES

NORTEL NETWORKS BayStack 70

Affordable, reliable, and fast connectivity for growing networks. Perfect for cost-conscious customers who don't need complicated management features, but who demand high-speed performance and scalability to support future needs, BayStack 70 switches boost the performance of desktops by providing dedicated bandwidth directly to users and high utilization servers.



- 10/100, full- and half-duplex autosensing on every port
- Ease of use
- Truly plug-and-play
- Full wire-speed forwarding rate
- Up to 12,000 MAC addresses
- Front panel MDI/MDI-X port
- Concise LED display and much more.

- (87936) **70-8T:** 8 ports 10/100 BaseTX, 8000 MAC addresses, desktop **\$650**
- (87937) **70-16T:** 16 ports 10/100BaseTX, 12000 MAC addresses, desktop **\$1,225**
- (87938) **70-24T:** 24 ports 10/100BaseTX, 12000 MAC addresses, rackmountable **\$2,290**

*Special while stocks last.

MANAGED SWITCHES

NORTEL NETWORKS BayStack 310

The BayStack 310-24T switch is designed to improve network performance and prepare networks for future bandwidth needs by segmenting the network into smaller domains, and by providing affordable dedicated bandwidth to power-user desktops and high-utilization servers. Cost effective desktop and segment ethernet switching - Scalable from one to three 10/100BaseTx switch ports - Flexible cabling options for fast ethernet, including copper or fiber - Advanced features include VLAN trunking and MultiLink trunking.



(87940) **310-24T:** 24 ports 10BaseT

\$2,170

NORTEL NETWORKS BayStack 350



Nortel Networks introduces the next generation of the most successful workgroup switches ever, completely redesigned for faster throughput, with support for high-speed uplink options, and leading-edge software features. Wire-speed throughput - 10/100 autosensing on every port - Advanced VLAN support - 802.1Q VLAN trunking - 802.1p priority queuing - MultiLink trunking - IGMP Snooping - More than 16,000 MAC addresses per switch - Supports spanning tree protocol - Flexible management choices - Concurrent RMON on every port - Enhanced port mirroring and much more.

- (87941) **350-12T:** 12 ports 10/100BaseTX **\$3,219**
- (56976) **350-24T:** 24 ports 10/100BaseTX **\$3,380**

STACKING SWITCHES

NORTEL NETWORKS BayStack 410

An affordable, stackable 10BASE-T switch solution for growing network environments. Flexible high-speed uplink options - Full autosensing on every port - High-density fiber ports - Redundant cascade stacking architecture - Wire-speed throughput - Advanced VLAN support - 802.1Q VLAN trunking - 802.1p priority queuing - IGMP snooping - Enterprise-sized MAC address table - Supports spanning tree protocol - Flexible management choices - Enhanced port mirroring - Recovery configuration file support and much more.



(87943) **410-24T:** 24 ports 10BaseT only

\$2,645

NORTEL NETWORKS BayStack 450



Ethernet switches featuring fail-safe stackability, flexible choices for high-speed uplinks, and advanced software features. Designed to provide high-density, high-performance switching for enterprise wiring closets, and to provide fail-safe scalability and advanced traffic management for rapidly growing networks. Full autosensing on every port - Redundant cascade stacking architecture - Wire-speed throughput - Advanced VLAN support - Enterprise-sized MAC address table etc.

- (87944) **450-12T:** 12 ports 10/100Base-TX **\$3,846**
- (87945) **450-24T:** 24 ports 10/100Base-TX **\$3,975**
- (87946) **450-12F:** 12 ports 100 Base FX **\$8,165**

*Special while stocks last.

Small-Medium Business Networks



Fly Buys.

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For all your small to medium business and home network needs please call for more information and pricing. We have an extensive range of fantastic D-Link products on our database.

Print Servers, Modems, Routers also available

Dial-up Router, Internet Server plus Remote Access Server

DP-300	Dual Speed 10/100Mbps Multiprot Print Server 2 parallel 1 serial	(53598) \$409
DP-602	Internet Server	(81535) \$419
DP-692 NEW!	2 port Internet Server with built in 9 port hub and uplink	(85108) \$488
DP-601M NEW!	Internet Server for SOHO network with built in 56K modem	(85107) \$425

Network Adapters also available

DE-660CT	PC Card 10Mb with RJ-45/BNC connectors	(35862) \$105
DFE-530TX	PCI bus dual speed 10/100Mb network card	(62956) \$63
DGE-500SX	PCI-bus 1000Mg Gigabit Ethernet Network Interface Card	(90752) \$899
DMF-560TXD	56K Modem/fax ethernet 10/100 dual speed N-way PCMCIA card - NO DONGLES - Direct port	(98305) \$369
DFE-660TX	PC Card 10/100 Base-TX Dual Speed	(69449) \$145

D-Link DES-3624 Series



(90759)

\$2825

Designed for the departmental networks, the DES-3624 series switches combine a high level of flexibility with advanced features. These switches can be stacked up to increase port density without sacrificing performance. With network management capability provided, users can also fine tune performance and set up security

- 20,22 or 24 10/100Mbps ports per switch
- Up to 94 switches per stack
- MDI uplink ports
- Up to 2 optional 100 Mbps fibre ports
- Up to 2 optional 1000 Gigabit fibre ports

USB Ports Available

DU-A2	PCI Port USB Adapter	(78987) \$48
DU-E10	USB to Ethernet Adapter	(88063) \$114
DU-H4	4 Port USB Hub	(79131) \$75
DU-H3SP	3 Port USB Hub	(78989) \$159

D-Link DI-701



(98249)

\$445

The D-Link DI-701 residential gateway protects your computers from hackers or unwanted users. It is easiest and safest way to share your high computer internet connection with a DSL Modem or Cable Modem.

DI-510	1 x WAN, 1 LAN Port ISIP* Router	(79398) \$379
DI-540	4 x WAN, 1 LAN Port ISIP* Router	(79400) \$990
DI-524	2 x WAN, 5 Port hub	(79399) \$718

* Internet Server IP

D-Link DFM-560E



(76739)

\$115

- K56Flex Auto-Detect
- Supports handset, headset or
- Half-Duplex Speakerphone Mode
- Windows NT 4.0 and 95/98 Compatible
- High Speed Fax Modem

DFM-560I	Rockwell Internal PCI Bus WIN Data/Fax/VoiceModem	(74361) \$69
DFM-560IS	Rockwell Internal PCI Bus software Data/Fax/VoiceModem	(85106) \$69
DU-560M	56K voice and data USB modem	(98306) \$134

Switches also available

Boost response times and bandwidth

DES-1016	16-port 10/100Mbps Dual Speed. Supports full/half duplex.	(69456) \$1,184
DES-1008D	8-port 10/100MB fast ethernet Switch with 8 x N-way UTP ports	(98254) \$364
DES-1024	24 port dual speed 10/100MB Smart rack mount Switch	(76740) \$1,546
DES-3225G	22 +2 Port 10/100Mbps Dual Speed Gigabit Switch	(90755) \$2,825
DES-1005D	5 Port 10/100Mbps Dual Speed. Supports full/half Duplex	(85101) \$170

D-Link DFE-905DX

The D-Link DFE-905 is a Dual Speed 5-port dual speed hub that can be configured to either 10Mb or 100Mb speeds. It is designed to offer connectivity in the small home, small office environment. The palm-sized device provides 5 ports to flexibility connect a small workgroup together on an Ethernet or Fast Ethernet network.



DE-809TP	9 Port Mini-Hub 9xUTP with Uplink Capability	(32350) \$154
DE-816TP	16 Port 10MB Hub with 1xAUI/1x BNC Ports (Rackmount)	(51844) \$265
DFE-905	Fast Ethernet Network Kit	(76617) \$289
DFE-908DX	10/100Mbps 8 Port Stackable dual speed hub	(60558) \$324
DFE-916DX	16 Port 10/100Mbps Desktop Hub	(72790) \$633
DFE-2624X	24 Port 10/100Mbps Dual Speed Hub	(98307) \$1,354

Information Access Solutions

**NEW
PRODUCT**

Xircom RealPort 2

The only access cards with integrated connectors!
No more hassles with fragile cables and pop-out jacks.

The Only Personalized Notebook Communications Solutions: The RealPort2 Integrated PC Card with Built-in Connectors and Mix and Match Flexibility. RealPort2 Integrated PC Cards with built-in connectors add flexibility by enabling users to choose from a wide variety of access cards that can be used alone or mixed and matched to meet communications requirements now and in the future. Combine a 56K modem, 10/100 Ethernet LAN, wireless data access via your mobile phone, ISDN and more! And add future technologies like broadband and Bluetooth when available.



5 Easy steps as follows:

1. Choose Desired Realport2 Cards
2. Flip one RealPort2 card over and place on top of the other
3. Align tabs and join cards
4. Insert joined cards into PC Card slot of Notebook
5. Plug in cables

See the Web
Direct for more
information on
this product!!

Realport2 Global Access Modem	(92739)	\$388
Realport2 10/100 Ethernet Card	(92746)	\$335
Realport2 CardBus 10/100 Ethernet	(92756)	\$335

**NEW
PRODUCT**

Xircom RealPort Value 56 Modem (72923)

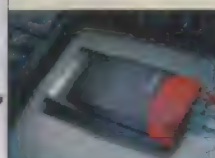


\$227



*500 Bonus Fly Buys points

Xircom Realport Ethernet 10/100 + Modem 56K (61795)



\$599



*500 Bonus Fly Buys points

Xircom Realport Ethernet 10/100 (67216)



\$270



*500 Bonus Fly Buys points

Xircom PortStation - Port Expansion System

The simple way to connect your Windows computer to virtually any number of devices. Connect printers, scanners, digital cameras, keyboards, mice and more. Image the ease of installing all your devices via one standard USB plug!



NEW!

- | | | | | |
|---|---|--|---|--|
| Supports all makes and models of Windows** computers with USB ports | Connects virtually any parallel, serial and USB devices | Interlocking "mix-and-match" modules can be added or removed at any time | Simply add or remove devices without reconfiguring or rebooting your computer | Modules snap into system for quick and easy installation |
|---|---|--|---|--|



1. Choose the modules you need to connect devices to your computer.
2. Snap modules and end caps together.
3. Attach devices to PortStation modules.
4. Connect PortStation to your computer's USB port.

PortStation Modules (82215)	\$159
End Caps	
7-port USB Hub Module: Adds 7 USB ports for printers, keyboards, mice, storage devices, etc. (82217)	\$162
Parallel DB-25 Module: Adds one parallel port for printers. (82218)	\$88
Serial DB-9 Module: Adds two serial ports for mice, handheld PDA cradles ext. modems etc. (82219)	\$210
Serial PS/2 Module: Adds two serial ports for mice, keyboards, etc. (82220)	\$118
Ethernet 10 Module: Provides connection to 10Mbps Ethernet networks. (82221)	\$178
Modem 56 Module: Provides high speed 56K* modem connection. (82222)	\$280
PortStation Kits (include end caps, AC power adapter and USB cable)	
USB Hub Starter Kit: 7-port USB Hub module (82223)	\$279
Connection Starter Kit: 4-port USB Hub + DB-25 + Serial PS/2 modules (82224)	\$399
Office Communications Starter Kit: DB-25 + Serial PS/2 + Ethernet 10 modules (82225)	\$470

*Fly Buys points on parts
72923, 67216, 61795 valid
20 April 00 to 31 May 00

MAY
31

Sales: 1300 13 9999
Fax: 1300 13 6666

Website: www.ht.com.au
E-mail: sales@ht.com.au

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Kiosks! See page 2**

Kodak

Fly Buys points on 80360, 80362, 81279, 84735, 80361 valid from 20 April 00 to 31 May 00

Order on-line, and register for even better pricing.

Web Direct

www.ht.com.au/cat/kodak

Dynamic Images. Dynamic Results.

Kodak DC280

FLY BUYS
1,000
BONUS POINTS



(80361)

\$1,079

*1000 bonus Fly Buys points

Fast, responsive and sophisticated, the KODAK DC280 means business.

Its intuitive design and responsive performance mean there's little learning curve. The DC280 lets you capture business images quickly and professionally. And then put them to work immediately.

- 2 Million Pixel Resolution
- 2x Optical and 3x Digital Zoom Lens
- USB compatible
- 8MB Picture Card
- Photodeluxe Pagemill and Photoprinter Software
- Rechargeable batteries and charger included

Kodak DC290

FLY BUYS
1,000
BONUS POINTS



(84735)

\$1,499

*1000 bonus Fly Buys points

The model of choice for high-end business picture takers. It gives you the ultimate in digital control thanks to its ability to "learn" scripts and applications—much like you'd customize your PC with different software.

- 2.1 Million Pixel Resolution
- Up to 3.3 Million Pixel Interpolated Resolution
- 3x Optical and 2x Digital Zoom
- JPEG and Uncompressed TIFF File Format
- Audio record and playback
- Burst capture mode
- 16MB Picture Card
- Rechargeable batteries/charger included

Kodak DC215 Zoom

It's a snap to use, thanks to the award-winning interface and controls. And we've packed all this functionality into a silver metal-skinned design, among the most compact on the market.



FLY BUYS
500
BONUS POINTS

- 1 Million pixel resolution
- 2x wide angle (29-58mm) optical glass zoom lens
- 4MB picture card
- USB Card Reader included

*500 bonus Fly Buys points

(80360)

\$429

Kodak DVC325

The KODAK DVC325 Digital Video Camera easy, fun way to capture and share quality digital pictures and video



FLY BUYS
500
BONUS POINTS

- Full motion video up to 30 frames per second
- Great 640x480 Still Images
- USB Interface
- Create videos that include text, video, audio and special effects with Presto! Videoworks software included
- Standard Tripod Socket

*500 bonus Fly Buys points

(80362)

\$156

Kodak DC215 Millenium

Represents outstanding value for money with USB card reader for up to 10 downloads. Stunning Gold Metal-skinned design amongst the best on the market.



FLY BUYS
500
BONUS POINTS

- 1 Million Pixel Resolution
- 2x wide angle (29x58mm) optical glass zoom lens
- 4Mb picture card
- Photodeluxe and pagemill software
- USB card reader included

*500 bonus Fly Buys points

(81279)

\$559

Kodak 4804IDE CD-R/RW Writer



- 24x Read, 4x CDR Write, 4x CDRW Write
- Disk-at-once and Track-at-once mode recording
- ATAPI Enhanced IDE Interface
- Gazo Personal Imaging Warehouse software

(84028)

\$459

Kodak
Accessories
32MB
Picture Card
(62677)
\$183

64MB
Picture Card
(82249)
\$285

96MB
Picture Card
(88332)
\$440

Premium
Camera Bag
(82273)
\$62

80 Minute
Ultima
(94493)
\$3

Kodak Gold
10 Pack
(53993)
\$26

Kodak Gold
100 Pack
(xxxxx)
\$Call

MAY
32

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Build your Desktop with Logitech

QuickCam™ Express

Snap stills. Shoot video. Email them anywhere in one click. Make live video calls! **QuickCam™ Express** – The simple way to get closer™.

- Capture stills and video instantly
- Email images with a single click
- Meet face-to-face online
- Over 2 million QuickCams sold
- USB connector for easy installation
- Works with Windows® 95 or 98



(80121) **\$80**

!!NEW!! QuickCam™ Web !!NEW!!

With **QuickCam Web** and its built-in microphone, you can easily make live video calls over the Internet. With Logitech's exclusive software, you can automatically broadcast images from your life, room, whatever - live over the Internet! It is called Web camming! And you can even create web pages featuring your videos and pictures captured with **QuickCam Web**. Requires Windows™ 98 and USB.



(87552) **\$189**

QuickCam Pro USB

True 640x480 resolution for stunning videos and pictures. With the QuickCam software, build fun web pages complete with streaming video or make live video calls (includes a Labtec microphone) over the Internet. Add titles, fade-in and fade-outs, audio tracks and more to your videos. Enhance your pictures with special effects such as sharpen, blur and more. And with the included digital surveillance software, easily set up a digital security camera.



(70566) **\$259**

Internet Keyboard with iTouch

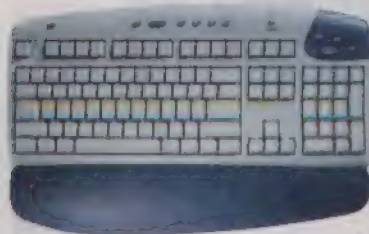
The Logitech Internet keyboard and iTouch software put one-touch Internet and multimedia control at your fingertips. Responsive keys provide an exceptional touch. Relax your hands on the attractive palm rest during breaks, and easily remove it for extra space. 3-year warranty.



(60332) **\$59**

Cordless Desktop iTouch

A cordless keyboard and cordless wheel mouse combination to free you from cords that tangle. No pointing at the computer or clear path required. With convenient iTouch Internet and multimedia control, access the Internet, search, open e-mail, play CDs, DVDs or MP3 and more with one touch of a key. 5-year warranty.

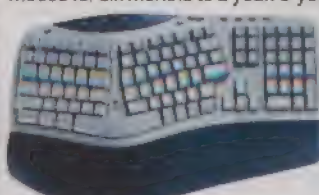


(82772)

\$159

!!NEW!! Cordless Desktop Pro

Cordless keyboard designed for easier typing and contoured soft-touch cordless wheel mouse free you from tangled cords. Innovative mouse design maximises comfort and control. Features convenient iTouch Internet and multimedia controls. Includes AAA batteries that power keyboard and mouse for six months to a year. 5-year warranty.



(87605)

\$239

SoundMan X2 Speakers

- High performance subwoofer and satellite speaker system
- Crisp clear highs and deep rich bass
- Theater-quality sound for CD music, Internet and games
- Total output power: 40 watts RMS, 320 watts PMPO
- 3-year warranty



(84808) **\$182**

TrackMan Live

TrackMan Live gives you cordless freedom for more interactive presentations. Thanks to Logitech's reliable digital radio technology, you can use it within a 10-meter range without the need to point it at the computer. The three buttons and trackball enable you to move forward or backward in your presentation, or customise buttons to meet your own needs. 3 year warranty.



(77753) **\$245**

Trackman Marble FX (54912)

\$145



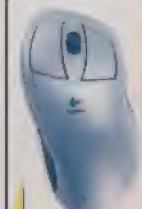
Cordless Wheel Mouse (77761)

\$89



Cordless MouseMan Wheel (78677)

\$109



MAY

33

DIAMOND

MULTIMEDIA

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Directwww.hl.com.au/cat/diamond

All new acceleration for your PC!



Viper II

Who Said Anything About Playing Fair?

Give yourself an unrivaled games advantage. The **Diamond Viper II** graphics card is equipped with 4X AGP power and a transformation and lighting engine for the most realistic images ever. Features include 32MB of high-speed memory, 128-bit acceleration, hurling 15 million triangles at your monitor every second for the most intense 3D action ever.

Diamond Viper II
(91527)

\$359

Monster Sound MX400

Up Your Audio!

Diamond's **Monster Sound MX400** delivers PC audio hardware acceleration for hardcore PC gamers and digital audio enthusiasts. Add the Rio PC upgrade for hardware accelerated MP3 playback, ripping and FM tuner for a whole new twist for your PC audio experience.

- Advanced positional audio technology
- Scorching 3D sound with TRUE quad output

Dolby Digital for PC home theatre Requires external amplifier or receiver.



now only (92050)

\$165

Stealth III S540

Xtreme gaming has arrived!

Stealth III S540 Xtreme delivers robust 2D/3D features and speedy performance at an unbelievable price. Based on the S3 Savage4 Xtreme chipset and featuring S3TC texture compression, integrated advanced 3D quality features include 128-bit processing, 32MB of memory, up to AGP 4X support, a 32-bit 3D rendering pipeline and massive texture processing now only (82715)

**\$234**

Also available in the stealth family:

Stealth III S540 PCI(89963) **\$195****Stealth II S540 AGP**(89964) **\$242****Fly Buys.**

Want **Fly Buys** with that?
Harris Technology now has Fly Buys.
1 point for \$5. Call for information.

SupraExpress 56e

Award-Winning Performance

Diamond's **SupraExpress 56e** is a powerful external modem. Designed to deliver award-winning 56K performance over a wide variety of line conditions, the SupraExpress gives you faster and more dependable Internet access. Offering incredible value, it is packaged with everything you need for fax, Internet and voicemail.



56K ITU Standard
230Kbps throughput
External reset switch

(87722)

\$149

Also available: Translucent
Teal/Purple

Rio 500

The Whole World is Listening

The **Rio 500** puts the power of digital audio in the palm of your hand! **Rio 500** is a skip-free, portable audio player that holds up to two hours of digital quality music and up to 32 hours of spoken audio content. Rio is the perfect companion for people on the go. 64MB built-in memory - expandable to 96MB. Back-lit LCD display with present & custom EQ functions - 13 hours playback with a single AA battery.



(81139)

Metallic Grey:

\$499**HARRIS TECHNOLOGY™**

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MAY
34



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Broadway (Sydney)
Burwood (Melbourne)

Kmart Shoppers!
Not all products are in-store, but consulting & advice available on all items

107S 17" Monitor



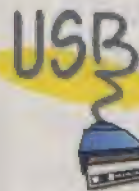
Plug and Play

NEW!

- 17" (16" VIS) colour monitor with excellent front of screen performance for use with MAC's & PC's.
- Autoscan covers horizontal frequencies up to 70KHz offering maximum resolution of 1280x1024 with flicker free display of 1024x768 at up to 85Hz.
- Flat Square High Contrast CRT with high resolution 0.27mm dot pitch (0.23mm hdp)
- Extremely small footprint: 17-inch conventional monitor with maximum depth of only 408mm/16.1".
- Multimedia base
- MPRII, E2000, NUTEK, EPA, FCC, CE and (58540) ISO9241 certified.

\$460

109P 19" Real Flat Monitor

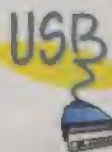


- 19" (18" VIS) Real Flat colour monitor featuring ICE technology for excellent front of screen performance for use with PC's or workstations.
- Autoscan covers horizontal frequencies up to 110KHz offering a maximum resolution of 1920x1440 with flicker free display of 1280x1024@ up to 103Hz
- Flat aperture grille CRT with high resolution 0.25mm grille pitch
- Large screen display in a small footprint
- Outstanding ease of use thanks to CustoMax monitor control software via USB

(77249)

\$1,235

201B 21" XSD Monitor

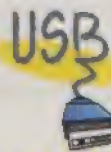


- 21" (20" VIS) colour monitor with excellent front of screen performance for use with PC's or Workstations.
- Autoscan covers horizontal frequencies up to 107KHz offering a max. resolution of 1920x1440 with flicker free display
- Flat Square Super High Contrast CRT with high resolution 0.25mm dot pitch
- Auto Calibrate extends the life of the monitor by automatically adjusting colour and luminance to original values.
- Outstanding ease of use thanks to CustoMax monitor control software

(44852)

\$1,699

150P 15.1" LCD XGA Monitor



NEW!

- 15.1" colour monitor with excellent display performance and viewing size comparable to a 17" CRT monitor
- 60% smaller footprint than comparable CRT monitors- only 165mm deep
- Dual input- accepts both DVI Digital and VGA Analog input
- Advanced AUTO adjustment automatically optimizes picture quality
- Built-in, front- firing stereo speakers and microphone for video conferencing and multimedia applications
- Monitor control via USB device with included CustoMax" software and optional USB Hub

(94489)

\$2,249

Philips Monitors
3 Year On-Site Warranty
Philips Australia provides a three year parts and labour on-site warranty to the original purchaser. A swap-out monitor will be provided to the customer within 24 hours by Philips.

MAY 35

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E-mail: sales@ht.com.au

Order on-line
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SONY

* Bonus Fly Buys points on 84022 valid from 20/04/00 to 31/05/00

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www.ht.com.au/cat/sony

Brand new state-of-the-art Monitors

SONY MEDIA



10 x CDR (branded) 74min

\$23 (26680)



10 x CDR (unbranded) 74min

\$27 (97902)



4x CDRW (preformatted) 74 min

\$11 (91467)



Box of 10 Floppy Discs IBM Formatted

\$8 (71268)



Box of 10 Coloured Floppy

\$9 (15972)



Mammoth-1 170M Tape 20GB

\$159 (SRP)

Sony SDMN50 Colour Monitor

The SDMN50 is ultra-thin, bold, and breathtakingly precise. The Sony Flat Panel Display delivers in places where the others can't. Provides cutting-edge performance and technology in a breakthrough space-saving design • 15" XGA TFT Active Matrix LCD Panel • low profile, easy-tilt design, black matte finish • separate ultra-thin screen and media box. (97422)

\$2,998



Pictured with optional Media Box

Sony CPDE200 17" FD Trinitron

Sony offers outstanding image quality with reduced glare and no picture distortion by utilising the latest unique Trinitron innovation - the FD Trinitron Multiscan CRT • 17" (16" viewable) • .24 - .25 aperture grille • high contrast anti-reflective coating • 1280 x 1024 @ 75Hz maximum resolution.

Sony's 3 Year On-Site Warranty *Conditions Apply

*Bonus 2000 Fly Buys points

\$799 (84022)



Sony Digital Mavica MVCFD90 Floppy Disk Digital Camera

Removable 3.5" 2HD floppy disk storage media • 1.3 mega pixel CCD interface • SXGA (1280x960), XGA (1024x768), VGA (640x480 pixel) resolution • Up to 30 images per 1.44MB floppy disc/1,272 per 64MB memory stick with optional MSACFD2M adaptor • 2.5" colour LCD • 560g • Voice Memo mode (up to 40 secs).

\$1949

(SRP)

Ask about other Sony Mavica models!!



CRX140EBK CD-R/RW kit 8x write, 4x rewrite, 32x read



This IDE interface drive ships complete with everything you need to get started. Includes interface and audio cables, mounting screws, Adaptec CD Creator & CD Direct Software installation and user manuals PLUS one CD-R and one CD-RW disk.

\$515 (88568)

CD-RW Drive CRX145SBK MAX Performance CD-RW Kit

The CRX145 offers MAXimum performance with the latest 10X recording technology, 32X playback and 4X RW. This high performance drive features SCSI interfacing and custom Sony Laser technology. A large 4MB buffer and special 4X audio mode combine for accelerated recording and anti-skip playback. Supplied as a kit with everything* required for installation & operation including cables, media, Adaptec CD Creator V4 & DirectCD V3 s/w. For a limited time includes bonus AWP s/w with everything required to get a business up & running on the Internet!

*SCSI Host Adaptor card not included

Bonus - Software

\$689

IDE version also available (97409) **\$649**



(97411)



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Finance methods subject to approval

36

Backup solutions from the leader in tape technology

Sony developed the DDS format and today remains the leading manufacturer of drives and media. The drives feature Helical Scan recording technology with high transfer rates achieved at low physical tape speeds for high reliability. Small and inexpensive 4mm tape cartridges hold up to 20GB with DCLZ hardware compression effectively increasing this up to as much as 40GB. Taking the DDS concept further, Sony's new 8mm AIT format combines even higher transfer rates with MAXIMUM reliability and one of the HIGHEST CAPACITIES in the industry.

**50-150GB
Capacity**

Sony SDX500C AIT-2 Drive



"Advanced Intelligent Tape-2"

- ★ 36GB and up to 50GB native capacities per tape
- ★ Advanced ALDC compression (up to 3:1)
- ★ 6MB/s native, up to 18MB/s compressed transfer
- ★ Dual spindle cartridge media with AM formulation
- ★ Advanced AME tapes can be used over 30,000 times
- ★ SCSI Ultra Wide Interface
- ★ 3 year warranty with Free on-site exchange

(88586) SDX500C Internal

\$7,215

(80636) SDXS500C External

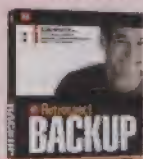
\$7,798

NEW Tape Backup Kits from Sony

Sony is pleased to offer a complete solution for all your backup requirements. Our new solution kits include:

- Interface Cables
- Mounting screws (Internal only)
- Faceplates. 3½" or 5¼" (Internal only)
- Easy Installation
- 1 Media tape
- Terminators (Ext. only)
- 3 year warranty with Free on-site exchange

Top selling backup software for
Workstation and Server installations



OR



PC Workstation Kit Solutions - PC's running

DOS, Win /95/98/NT Workstation or OS/2

DDS-2 Kit 4-8GB

Internal SDT7000K

(84341) **\$1,299**

External SDTS7000K

(88572) **\$1,569**

DDS-3 Kit 12-24GB

Internal SDT9000K

(88573) **\$1,729**

External SDTS9000K

(88574) **\$1,984**



DDS-4 20-40GB also Available

PC Server Kit Solutions - For servers running Windows NT server with up to 250 users or Netware up to 25 users (upgrades/crossgrades enable larger installations to be supported).

DDS-3 Kit 12-24GB

Internal SDT9000KN

(91462) **\$2,345**

External SDTS9000KN

(91464) **\$2,450**

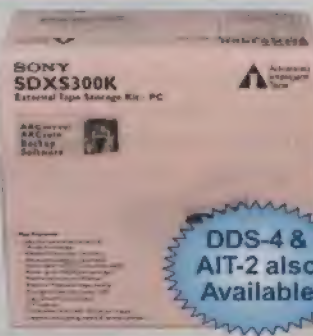
AIT-1 Kit 25-105GB

Internal SDX300K

(88583) **\$4,119**

External SDXS300K

(88584) **\$4,699**



DDS-4 & AIT-2 also Available

SONY TAPES



**DDS-1 4mm
90m 2GB**

\$11

(06103)



**DDS-2 4mm
120m 4GB**

\$25

(13262)



**DDS-3 4mm
125m 12GB**

\$40

(66576)



**DDS-4 4mm
150m 20GB**

\$80 **NEW**

(88711)



**AIT-1 AME
230m 35GB**

\$210

(88719)



**AIT-2 AME
230m 50GB**

\$244

(95088)

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as 5 pack



Next Generation Backup Solutions

More from
Digital Tape
Solutions

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DLT4000/ST
(70917)

\$3,600

Quantum
DLT7000/ST.
(41608)

\$8,390

Quantum
DLT8000/ST.
(82501)

\$8,480

DLTape media

DLT2000XT 15/
30GB Tape
(68362)

\$85

DLT4000 20/
80GB Tape
(71231)

\$150

DLTclean
Cleaning Tapes
(97851)

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Open File Manager



Your back up systems play a critical role in your company's operation. Unfortunately there is a gap in every NT and Netware backup program. Most backup programs don't even attempt to include open email, databases, web server or other files. That's where St. Bernard Software's Open File Manager comes in. It is the only utility that allows all major backup programs to consistently capture the mission critical open files at any time. Open File Manager (OFM) ensures a complete and accurate backup, reliably and easily, even if the files are in use.

ECRIX VXA-1 Tape Drive



- 33 GB Native, 66GB compressed
- 3-6MB sec sustained, that's 21.6GB/Hour
- SCSI-2 and LVD models available.
- Variable speed operation matches data throughput to your computer
- Packet based technology guarantees reliable restores
- LINUX approved
- Variety of case colours (*White, black, red, translucent)
- Compatible with most backup software

Backup Software - TapeWare



TapeWare
Lite: Single
Server backup
for NT,
Netware or
Linux

(97849)

\$425

TapeWare - Loaded with features yet simple to use. TapeWare is simple to install and easy to administer whether you have a single PC or a large enterprise network.

- Quick Start Wizards set up most common applications quickly
- Advanced and predefined scheduling features
- Built in free 6 slot autoloader support
- Desktop, Single Server, Enterprise and Data Centre Versions
- Options for MS-Exchange, Cluster, SQL, SAN etc

Benchmark DLT Tape Drive



Internal (88037) **\$3,445**

External (88038) **\$3,699**

- 40GB native, 80GB compressed
- 3-6MB sec sustained, that's 21.6GB/Hour
- Ultra Wide SCSI LVD interface
- Reads DLT4000 tapes (20/40Gb Only)
- Internal or External models
- LINUX Approved
- 7 tape autoloader available
- Compatible with most common backup software
- Standard DLT form factor

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Signature III Colour CD Printer



Personalise your CD's

The Signature III Colour CD Printer is a new, third generation ink-jet CD Colour printer from industry leader Primera Technology. It combines the fastest print speed ever offered with the highest print resolution available in

the world today: 1200x1200dpi for a stunning 1.44 million pixels per square inch.

(89186) **\$2,895**

Comet Autoloader for Signature Printers



Hands Free CD Printing!

The Champion Comet is the first economical, desktop printer loader designed for the signature II and III printers. The loader stacks up to 50 printable discs the loads them into the printer tray. After printing, the discs are deposited into the output tray.

Printer pictured but not included
(97769)

\$2,840

Verbatim 56K CompactModem

Compatible with Windows® CE based Palm PCs and Handheld PCs

The Pretec CompactModem from Verbatim is the world's first and smallest 56kbps Fax/Modem card for Windows CE based Palm PCs and handheld PCs. Video conferencing ready. Supports V.80 application for synchronous H.324 streaming. Supports V.90 and K56flex. Win 95/98/NT/CE compatible. By connecting the CompactFlash adapter included, this modem also becomes a fully-fledged PC card able to be used with most laptops/notebooks.



(83607)

\$299

CopySmart Cd Duplicator



NEW
LOW
PRICE

4x Write, 4x ReWrite, 32x Read

COPYSMART 4x 4x 32x CD DUPLICATOR

As easy to use as a photocopier!

Stand-alone or PC connected one-to-one duplicator able to record to both CD-R and CD-RW media. 4x CD-R, 4x CD-RW copy functions. Simple 4 button interface allowing Speed selection, Test, Copy, Compare and Quick Erase. PC based Data and Audio copying Software included.

NEW!!!

(92173)

\$1,925

Verbatim Slim-line PC Card CD-ROM Drive

Add a CD-ROM to your Laptop!



This 24xCD-ROM can connect to any PC Card enabled PC or Notebook and is ideal for mobile computing for notebook users with no CD-Rom

drive built-in. The drive is plug-and-play making installation a breeze and the slim-line tray reduces the size of traditional external PCMCIA CD-ROM drives through its lightweight and low profile design. The control panel on the top of the case allows for easy playback of audio CD's

(97766) **\$399**

More from Verbatim CD Travel Case

Lightweight. Scuff proof exterior. Fabric lined disc holders prevent scratching and sticking of CD's.



For 24 CDs:
(79583)

\$20



For 48 CDs:
(79584)

\$29

Headset with Microphone



Vertical in-ear stereo headphone with adjustable microphone boom. Ideal for notebook users. Designed for multimedia convenience. Lightweight and compact, adjustable headband. (Must be powered by a soundcard) (77819)

\$19

Verbatim

Blank CD Media

Writable: (CD-R)

74 min. 650MB

Single (74740)

\$3

74 min. 650MB

10-pack (76731)

\$25

80 min. 700MB

Single (87392)

\$3

ReWritable: (CD-RW)

74 min. 650MB

2x/4x Speed

(77492) Single

\$6

Verbatim DataLifePlus® blank discs have an extra durable, printable surface.



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MP9060A



For high performance you can depend on.

- ✓ Four in one drive saves money and slot space. This also means that the drive uses only one IDE interface.
- ✓ A pick up module designed for DVD allows for high quality precise CD-R/RW writing.
- ✓ Extra large 2MB buffer memory assures smooth DVD title playback even with low quality media.
- ✓ The low power consumption design needs no cooling. This design also helps achieve class 3 million environments along with a dustproof environment.

The Deciding Factor

Bundled software that makes the most of your MP9060A

All the software you need to get maximum performance from your CD-R/RW and DVD-ROM drive is provided with the MP9060A. Professional CD-R/RW pre-mastering software and easy to use packet writing software are included, along with full featured DVD playback software.

(89172)

\$680

MP7080 Series

Store Your Best Ideas, Faaaast

Be ready whenever the inspiration strikes, with the lightning fast Rich MP7080 Series.

A leader in CD-R/RW IDE drives, steps ahead again. An ultimate 8x4x32c CD-R/RW drive from Ricoh has arrived.

With a high power laser diode and improved precise pulse strategy enabled 8x CD-R writing. A newly developed LSI which controls write power and pulse width sets in details, also contributes to stable high speed writing.

A Large 4MB buffer memory was installed to achieve stable writing to avoid buffer under even at 8x writing. Power consumption kept the same with the previous drive whilst CD-R writing speed increased over 30%. This low power consumption drive is suitable for power critical internal use

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\$595



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NEW!!



BJC-3000

The BJC-3000 offers an array of features, including resolution up to 1440dpi, and the option of converting your printer into a high quality colour scanner.

- Resolution up to 1440x720dpi both black/standard colour
- **Separate ink tanks, low ink detection system.**
- Variable Drop Modulation Technology allows it to generate any of five different dot patterns on the horizontal axis.
- Up to 9ppm print speed black
- Super fast extra rich blacks.
- Optional Photorealism for exceptional photo quality printing
- Colour Scanner cartridge option. Turns your printer into a high quality colour scanner with resolution up to 720dpi.
- Connection- parallel and USB are standard, compatible with Win 9x & NT4 and iMac.
- Canon care and dependability. Canon BJC-3000 also features a one year warranty upgradeable to 3 years, backed up by Customer Care Hotline Support and drivers available on the web site www.canon.com.au



**BC-33 Black/Colour
Cartridge INCLUDED**
valued at \$95 (95972)

(94499)

\$269

**BC-30 Black
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Cartridge**
(81582)
\$84

**BC-34 Photo
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Optional
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(95973)
\$95

**IS-32
Scanner
Cartridge
Optional**
(94625) **\$140**

BJC-265SP

Super Economy mode: cartridges deliver up to 400 pages in colour, 2400 in black. Up to 4ppm in black, up to 0.3ppm colour. Banner printing capable.

(76009)

\$139



LBP800

Compact desktop laser with face up/down paper delivery, 125 page Multipurpose tray and single sheet Manual Feed Slot. 8ppm, 300x300dpi, 600x600dpi and 2,400dpi with text and line smoothing. 512K buffer. 2,500 pages per cartridge (5% cover). Drivers available: Windows® 95, 98 and NT 4.0.

(83787)

\$549



BJC-6500

A powerful and perfect business solution- A3 compatible, sharper blacker text.

Economical independent ink tank system, separate ink tanks for each colour.

Six colour printing ensures photo quality. 9ppm black, 6ppm colour.

(95962)

\$679



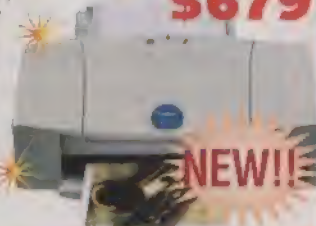
NEW!!

BJC-8200

Photographic printing quality 1200 x 1200 dpi, PhotoRealism 6 colour printing, Separate ink tanks for each colour with level detection system, Optional scanning at 600 dpi, Parallel connectivity for Windows® 95/Windows® 98 & Windows® NT 4.0 USB connectivity for pre-installed Windows.

(95964)

\$679



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Most compact, lightweight flatbed scanners available!

New from Canon is this range of stylish flatbed scanners, offering the cutting edge in technology. They are the most compact, lightweight flatbed scanners available on the market today: barely larger than an A4 sheet and only 39mm high, they are sure to fit on any desk. Offering improved resolution and colour recognition, these new scanners come with a complete 'out

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- Super slim & compact
- Plug & Play

- 36-bit
- Fully integrated software package



FB-330P

Parallel. Optical resolution. 300x600dpi.

(83661)

\$135

FB-630P

Parallel. Optical resolution. 600x1200dpi.

(83673)

\$189

FB-630U

USB to suit Win98 & iMac. 600 x 1200dpi opt. res. One-touch scan button.

(83685)

\$219

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HP ScanJets

HP ScanJet 4200

Highest productivity for business

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- HP's Intelligent Scanning Technology provides fast photo-quality results
- Quick and easy installation through USB.
- Scan, copy, email at the touch of a button



(74117) **\$275**

HP ScanJet 5300

Turn the Desktop into an imaging and document centre!

- 1200dpi optical, 9600dpi enhanced
- HP Intelligent scanning technology to deliver consistently superior results
- Worry-free USB connectivity. Also has parallel connectivity.



(93770) **\$530**

HP ScanJet 6300

Best image quality for professionals

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- Scan, copy, E-mail, Fax, Document Management Button
- 36 bit colour
- 5 front panel buttons
- 35mm Slide Adapter.



(81726) **\$725**



Please call us or see the Web Site for HP Scanjet and Omnipage packages to suit your needs.

HP DeskJets

HP DeskJet 930C

Compact Photo- Quality Colour InkJet Printer

- Alternative 2400x1200dpi mode on photo paper with HP PhotoREt 3
- Excellent results on all types of media in all modes
- Prints up to 9ppm black and 7.5ppm colour



(95761) **\$420**

HP DeskJet 970Cxi

The premier photo quality printer for professionals

- Up to 2400dpi InkJet with HP PhotoREt 3.
- Up to 12ppm print speed (black) and up to 10ppm (colour)
- New! Automatic two-sided printing



(84363) **\$720**

HP DeskJet 1220C

High Performance Wide-Format InkJet Printer for All Business Needs

- Black 600dpi
- Colour 2400x1200dpi mode on photo paper with HP PhotoREt 3
- Prints up to 11ppm black and 9.5ppm colour
- Prints a wide range of sizes- from postcard (4"x6") to poster (13"x19") on a variety of media



(95763) **\$950**

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HP All-in-One

HP OfficeJet T45

All Colour: Printer, Copier, Scanner and Fax

- 600x600dpi InkJet Printer with HP PhotoREt II
- Up to 9ppm print speed (black) and 6.5ppm (colour)
- 75 speed dials, 55 page fax memory
- Up to 1200dpi enhanced (300dpi optical) scanning, 24bit colour
- Up to 99 copies from original



(84356)

\$845

HP OfficeJet R45

All Colour: Printer, Copier, and Scanner

- 600x600dpi InkJet Printer with HP PhotoREt II
- Up to 11ppm print speed (black) Up to 8.5ppm (colour)
- 600x2400dpi, up to 9600dpi enhanced scanning, 30bit colour
- Up to 50 copies from original



(80302)

\$925

HP LaserJet 3150

High quality, Networkable All-in-One.

- 6ppm at 600dpi Print Speed top quality
- One touch send-to-Email scan
- 6ppm at 600dpi enhanced copier
- Internet Fax, full-featured professional LaserJet fax machine
- Additional convenience features include billing code, block fax, dial prefix capabilities



(93899)

\$1,350

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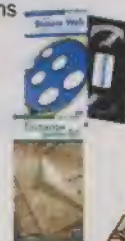
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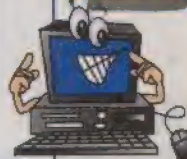
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DuoScan T1200 SCSI-2. 36 bit. Transparency scanning. Opt. res. 600x1200ppi (74498)

\$1,315



DuoScan T2500 SCSI-2. 36 bit. Transparency scanning. True opt. res. 1250ppi (74499)

\$8,185

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(92981) **\$4,498**

DuoScan HiD

A dependable addition for any graphic professional. The new DuoScan HiD goes one step further with advanced 42 Bit colour depth and with 3.7. Dynamic range means more colours and definition • 1000 x 2000 true optical resolution, with interpolation to 4000 ppi • Agfa TwinPlate Technology provides separate scanning bed for reflective and transparency scanning • Agfa FotoLook 3.5 comprehensive scanner software (including superb negative scanning capabilities, variable USM, Batch scanning and control over colour and tonal corrections) • Agfa ColorTune colour management system includes IT8 colour calibration charts and an extensive range of ICC-compatible device profiles • 4 glass-less batch scanning holders (35mm film strips, 35mm framed, 6x9cm and 4"x5" films)

SnapScan Touch



USB
(87209) **\$253**

Agfa's revolutionary SnapScan Touch USB Scanner has four programmable buttons: scan direct to file, email, fax or printer. 600x1200 ppi, 36 bit, landscape desktop scanner. Comes with 7 translucent coloured handles! Software: Agfa ScanWise, Caere OmniPage LE OCR, & more.

ePhoto CL30 Klik!



USB
(89409) **\$1,218**

The fantastic ePhoto CL30 now available with built-in Iomega Klik! Drive. Megapixel digital camera with USB interface and a resolution of 1440x1080 pixels. Features an optical viewfinder and 1.8" colour LCD screen. Auto focus lens with 2x digital zoom and macro function.

SnapScan 1236u



USB
(84306) **\$339**

One pass, high quality 600x1200ppi scanner (9600ppi max.) with USB interface. 36 bit colour. Comes bundled with Caere OmniPage LE OCR, Caere PageKeeper, Corel Print-House Magic Select & Agfa's incredible ScanWise software. Win98 compatible. ADF & TPO available.

ePhoto CL50



(76793) **\$1,409**

Digital camera with built-in microphone for adding up to 10 seconds of voice or sound per image. Resolution 1600x1200 pixels. 3x optical, 2x digital zoom. Optical viewfinder and 2" LCD screen. Burst mode: hold shutter for continuous shots. The included 8MB card stores up to 96 photos.

SnapScan 1212u



USB
White: (74496) **\$249**
Green: (75578) **\$259**

One pass, high quality 600x1200ppi scanner (9600ppi max.) with USB interface. Includes Caere OmniPage LE OCR, Caere PageKeeper, Corel Print-House Magic Select & Agfa's incredible ScanWise software. Win98 compatible. "Best Scanner 1999" - PC World magazine

SnapScan 1212p



(74495) **\$175**

One pass, high quality 600x1200ppi scanner (9600ppi max.) with parallel interface. Includes Caere OmniPage LE OCR, Caere PageKeeper, Corel Print-House Magic Select & Agfa's incredible ScanWise software. Compatible with Win95/98/NT.

LaserJet and InkJet Printers

HP LaserJet 1100 Printer

HP's JetPath technology allows you the flexibility to expand the LJ 1100 into an all-in-one performer when your business needs grow. Crisp, sharp 600dpi laser printing. 8ppm. 2MB RAM.



HP LaserJet 1100A Printer-Copier-Scanner

If your current business needs require the LaserJet 1100 with copying & scanning capabilities, move up to the LaserJet 1100A. Printing, copying and scanning: all-in-one. Make laser copies at the touch of a button. Scan resolution 600dpi enhanced, 300dpi optical.

(70095) **\$783**

(70096) **\$775**

HP LaserJet 2100 Series

All models feature:

- 1200dpi resolution
- 10ppm print speed
- 60MHz processor
- 350-sheet capacity
- 15,000 page monthly duty cycle
- Excellent performance

LaserJet 2100

(72291)

A fast flexible laser with room to grow. EIO, PCL 6, 4MB RAM.

\$1,345

LaserJet 2100M

(72292)

A fast flexible laser with PS and PCL. EIO, PCL 6, 8MB RAM.

\$1,595

LaserJet 2100TN

(72293)

A complete network printer. EIO, PCL 6, 8MB RAM, additional 250-sheet feeder, HP JetDirect print server installed.

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HP LaserJet 4050 Series

All models feature:

- 1200dpi resolution
- 16ppm print speed
- 133MHz processor
- 500-sheet capacity

LaserJet 4050

(77443)

PCL 6, 8MB RAM.

\$2,279

LaserJet 4050N

(77445)

PCL 6, 16MB RAM.

\$2,850

LaserJet 4050TN

(77446)

PCL 6, 16MB RAM

\$3,375



HP Colour LaserJet 4500 Series

Delivers high quality 600dpi colour graphics. 16ppm mono, 4ppm colour. 32MB RAM. 133 MHz processor. 900 pages input. Superior network management. Duplex capable. Automatic transparencies sensing. Reliable and cost-effective. Improved paper handling.

From: (70356) **\$5,193**



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quality!

HP Professional Colour InkJet Printers



HP 2000 Series: Business performance with break-through colour print speed. Black: 600dpi, 10 ppm. Colour: PhotoREt II, 4ppm. Low printing costs. Four individually replaceable ink cartridges. Outstanding quality. 5,000 pages monthly duty cycle. 2MB RAM.

2000C Excellent colour print quality for a great price! (69484) **\$870**

2000CN Network ready, additional 250 sheet paper tray (69485) **\$1,554**



HP 2500 Series: Fast, brilliant colour printing for the workgroup. **A3 capable.** Black: 600dpi, 9ppm. Colour: 3.5ppm. Rugged and robust. Low cost per page. 4 individually replaceable ink cartridges. Versatile media handling. 12,000 pages monthly duty cycle.

2500C 4MB RAM (70725) **\$1,980**

2500CM Network ready, Adobe PostScript, 20MB RAM (76060) **\$2,880**

Stunning Performance



- At breakthrough speeds.

The Phaser 850 is nothing less than an exceptional, network-ready, powerhouse colour printer. It's in a class of its own. Extremely easy to use, it also boasts surprisingly flexible paper handling and automatic two-sided printing.

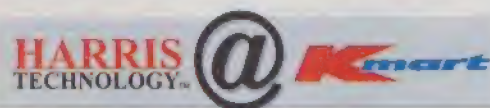
Breakthrough speeds- up to 14 pages per minute

Unbeatable power - 200MHz processor

Dazzling colour - up to 1200 dpi and ColorSync savvy, Adobe PostScript 3

Free black ink- means low cost per print

On-board networking- 10/100BaseT Ethernet or native USB



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with Free
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(92500)

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Magenta
(92501)

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\$179

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Model	Tektronix	850/N	850/DP	850/DX
Resolution		800 dpi	1200 dpi	1200 dpi
Memory Standard/Max		32 MB (256 MB)	64 MB (256 MB)	128 MB (256 MB)
Built-in Hard Disk		Optional	Optional	2 GB Hard Disk
RISC PowerPC Image Processor		200 MHz	200 MHz	200 MHz
Max. Speed Fast Colour		14 ppm	14 ppm	14 ppm
Max. Speed Standard		8 ppm	8 ppm	8 ppm
Max. Speed Enhanced		4 ppm	4 ppm	4 ppm
Max. Speed High Resolution/Photo		2 ppm	2 ppm	2 ppm
Pipeline Printing		Optional	Standard	Standard
Job Accounting		50 Jobs	500 Jobs	5,000 Jobs
Collation Printing		Optional	Yes	Yes
Duplex Built-in Automatic		Optional	Standard	Standard
Main Paper Tray 200-sheet		Standard	Standard	Standard
Hi-capacity Tray 500-sheet each (two)		Optional	Standard (one)	Standard (one)
Prt number		(90162)	(90163)	(90164)
Price		\$5,729	\$7,397	\$9,570

¹Requires optional hard disk drive.

Call Harris Technology on 1300 13 9999
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4 ppm
colour

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\$875 with the QMS
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copier/scanner



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capability can be
added to the QMS
Magicolor 2 DeskLaser
printers with the QMS
ScanCopier 200, giving users

a very flexible product for printing and copying, in
colour, at a very affordable price. Its control panel has
the familiar look of a normal photocopier and copying
is performed at the touch of a single button. The QMS
ScanCopier 200's flatbed scanner can
be simultaneously connected to
a PC, enabling it to operate as
a full function digital scanner
as well as a digital copier.

\$875

(83589)



16ppm
mono

4 ppm
colour

Standard
Ethernet

Duplexing
unit

**Magicolor 2
DeskLaser
with Duplex**

\$5,545 (83653)

Why QMS?

The Magicolor range from QMS comprises nine
different models incorporating features such as
oversized-A3, PostScript, and auto duplexing. Within
the Magicolor range there is a printer available to suit
your individual needs. The outstanding advantage is
that you don't need to pay thousands of dollars for
costly add-ons that you don't require. The Magicolor 2
DeskLaser range utilises the power of Windows to
produce 16 pages per minute in monochrome and 4
pages per minute in colour, prints at 600 x 600 dpi,
has 24MB RAM, ships with ethernet as standard and
has the option to automatically duplex. These printers
are an ideal investment for emergency/short run
brochures, sales proposals, presentation, company
reports, letters, etc.

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Hardware
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Video Editing Hardware

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Studio PCTV Rave

- Watch TV on your PC
- Receive Teletext
- Capture Video into your PC
- Video Conferencing



(86787)
\$150

Studio MP10

- External easy-to-set up parallel port device.
- Capture video's into your PC.
- Edit your videos using Studio software
- Create Multimedia and Video CDs
- Archive your old videos on CD Rom
- Create Streaming Videos for the net



(80256)
\$665

Studio PCTV

- All the features of PCTV Rave and MPEG-1
- Edit your videos with Studio Software
- Add special FX and music to your videos
- Create Streaming videos for the Net
- Capture Still Images in your PC
- Includes Remote Control



(80290)
\$225

Studio PCTV Pro

- All the Features of PCTV
- Receive FM Stereo Radio
- Receive Stereo TV audio
- Includes Remote Control



(80291)
\$345

Studio PCTV USB

- All the features of PCTV Pro
- Hot-Pluggable USB external device
- Take Still image using "Snap Shot" button



USB
(85878)
\$345

Studio DC10 Plus

- Capture videos into you PC at full resolution
- Edit your videos using Studio editing software
- Make short home movies (back to tape)
- Create Background music and record Voiceovers



(75800)
\$665

Studio DV

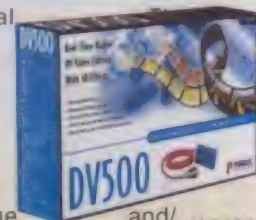
- Capture, Edit and Output DV quality videos
- Connect and control your DV camcorder
- Edit your DV Video's With Studio software
- Create Video CDs and Streaming videos
- SmartCapture technology saves Hard disk space



(87677)
\$665

NEW PRODUCT! DV500

- Dual-Stream Video for Real FX
- Capture & edit full DV quality video
- DV device control with automatic scene detection
- Analogue & DV connections
- Capture and output analogue or DV videos



and/ (87676)
\$1990

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Software
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for
information
on these
and other
Pinnacle
products.

MAY
48

What today's CAD designers want

AutoCAD LT 2000

Full Version: (81482) **\$789**



Upgrade:
(81486) **\$269**

AutoCAD LT® 2000 is the perfect low-cost,

2D CAD tool for today's design environment. That's because there's usually an extended design team working on every project. From the architects and engineers to the drafters, consultants, and clients—your entire team will communicate more easily, share data more accurately, and work more efficiently thanks to all of the professional-strength features of new AutoCAD LT 2000.

Actrix Technical

(79021) **\$495**



2D
Diagramming
tool

Imports
DWG files

Provides a truly automated drawing en-

vironment for easily creating a full range of dynamic drawings, from facilities plans to technical schematics to business diagrams. Establishes a new standard for intuitiveness and simplicity. Just select the template that suits your task and browse the catalogs you're shown. Then drag and drop the ActiveShapes™ objects you need into your diagram or drawing.

Actrix Business

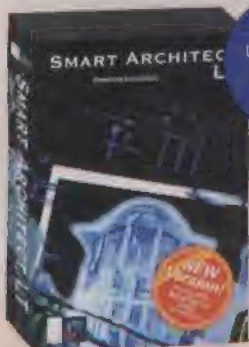
(81492) **\$179**



Create
professional-
looking,
effective
diagrams

Hit the ground running with a familiar Microsoft

Office-like interface and more than 1,000 pre-defined drag and drop Active Shapes, objects organised into easy access catalogs. Easily drop your diagrams into Microsoft Word, or Powerpoint documents, or publish files as HTML pages on the Internet, complete with Hyperlinks. Express your ideas clearly through compelling visuals that facilitate communications and expedite decisions.



Free
upgrade to
LT 2000
version!

Smart Architect LT

This architectural drafting application vastly enhances the ability of AutoCAD LT 97 and 98. It caters for all types of building development. The main features consist of walls, windows, doors and roofs, giving the ability to generate 2D drawings and 3D models. Provides tools to cut sections, peel off elevations and automatically dimension the building.

(86112) **\$879**



Free
upgrade to
LT 2000
version!

LT 3D

LT3D is a full 3D modelling plug-in for AutoCAD LT 97 or 98. LT3D provides AutoCAD LT with a range of tools to cater for all types of 3D modelling as well as the power to modify and measure. It includes routines for creating 3D surfaces and solids, and tools for modifying and editing them. In addition there are some routines to make viewing and manipulating your 3D scene much easier.

(86113) **\$259**

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Don't forget your Fly Buys points.



(You will need to provide a copy of your Student ID)

(86114) **\$245**

AutoCAD 2000

Student Version

A feature-rich, streamlined, forward-looking release of the world's leading CAD software product. More than 400 new and enhanced productivity tools. Quickly search, extract and re-use specific design data. Works simultaneously between drawn files. Drag and drop exchange of design information from file to file. Automatically scales drawings to fit your plotter.



(You will need to provide a copy of your Student ID)

(86115) **\$195**

3D Studio Max + Character Studio

Student Version

3D Studio Max: Professional 3D modelling and animation. Quickly create richly textured, high quality images and animations. Character Studio is an extension for 3D Studio MAX. For large-scale, professional character animation production. Create characters that move with amazing realism.

Professional Video Tools



canopus EZDV

From the makers of the award winning DVRApator: Fast, Friendly and Easy DV Editing for your desktop.

- Rock Solid DV Codec - Only from Canopus
- Compatible with DV and Digital8 cameras
- Frame accurate camera control
- Easy to learn and use EZEdit software (included)
- Captures selected clips or complete videotapes
- High speed rendering
- SoftXplode 2D and 3D special effects software (included)
- High Speed filtering and image enhancements



**NEW
RELEASE**

(97877)

\$665

Matrox RT2000

Professional Realtime Editing for corporate, event and multimedia artists

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- Realtime broadcast-quality 3D DVE
- Native-DV and MPEG-2 editing
- 1394, Y/C, and composite I/O
- MPEG-2 output for DVD and CD authoring
- MPEG-1 and RealVideo output for web streaming
- Matrox Millennium G400 high-performance desktop
- Genlocked stereo audio I/O ensures perfect lip-sync



(89082)

Complete content creation software bundle —

Adobe Premiere RT, Ulead Cool 3D, Sonic Foundry ACID Music, Sonic DVDIt!

\$2,829

MAY
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TV Tuners, & Music Management



ACID MUSIC

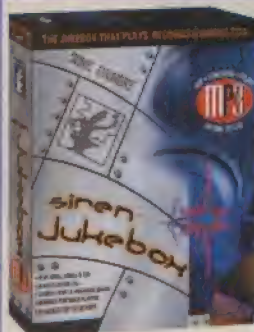
2.0

IDEAL

FOR  THE
HOME

The one software package you need to create professional music in any style imaginable including rock, techno, funk, hip-hop, and more! This software is as easy as Pick, Paint and Play. You'll be able to create and edit your composition instantly. Now with MP3 encoding built in.

Acid DJ, Rock or Hip Hop	(89069 or 89070 or 89071)	\$89
Acid Music	(89068)	\$135
Sound Forge 4.5XP (not Pic.)	(79011)	\$99



SIREN JUKEBOX

RIP IT.

BURN IT.

PLAY WITH IT.

MP3 Ready.

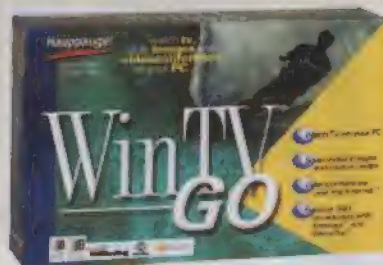
Siren Jukebox is the highest quality and most fun way to control your music.

- * RIP music from CD, the net, or any other source.
- * BURN it to your Hard Drive or CD (Built in Direct CD Burning)
- * PLAY with it with 16-band EQ, Reverb, and other effects. Loaded with mind-blowing eye candy and top-of-the-line features.
- * Take it with you in your Rio or Nomad.

Siren Jukebox	(89075)	\$73
---------------	---------	-------------

Hauppauge TV (WinTV)

- Watching Television on your computer has never been easier with WinTV
- Watch Live TV or video on your PC while surfing the Web..(in a window or full screen).
- Channel surf 16 channels at once
- Professional teletext reception. DDE (export data from teletext to your spreadsheet), print, save and more
- Capture video images, motion video. High quality video still capture 1600x1200 pixels, BMP, TIF, TGA, GIF, JPEG formats.
- Video clip capture in Microsoft AVI file format - from TV or any video source
- Video conference over the Internet with Microsoft NetMeeting or CU-SeeMe.
- Create home movie AVI's and send them to friends via e-mail.
- Win 95, 98, NT 4.0, Win2000 and Linux.



WinTV Go	(89063)	\$168
WinTV Go-FM (incl. FM stereo radio)	(89064)	\$218
WinTV Radio	(89065)	\$314
WinTV USB (Connect in seconds)	(89066)	\$260
WinTV USB with FM Radio	(98455)	\$349

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Dramatically Different Graphics



Matrox Millennium G400 Dual Head Graphics Acceleration Card

Supports a 2nd display! (monitor or TV)



- Extend applications and tool bars across two displays
- Display DVD video full-screen out to TV
- Retouch an image by zooming it to full-screen
- Play a 3D game on a big screen TV

Armed with the industry's fastest graphics chip, the Millennium G400 Series takes explosive acceleration two steps further by adding unprecedented image quality, along with the most versatile display options for all your 3D, 2D and DVD applications. It delivers superb games performance as well as the speed, image quality and multimedia ability. The MAX version in the series offers even faster performance and a 360 Mhz DAC for ultra crisp display at high resolutions.

- Environment mapped bump mapping - a sensational 3D feature. Only card to support this!
- DualHead models run 2 monitors from the one G400 card
- Amazing! Many interesting uses. (see left) Look at www.matrox.com/g400/applications/dual/home.htm for more information.
- Stunning on-screen visual quality
- Explosive 3D, 2D and DVD performance
- Superior DVD and TV output
- Upgradable to video capture & video editing (TV, VCR, PC output)

G400 32MB RAM	(78103)	\$415
G400 16MB RAM	(78105)	\$329
G400 MAX 32MB RAM	(78106)	\$479

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The solution **Novell** rely on to protect their own NetWare Servers **WORLDWIDE**

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PLUS

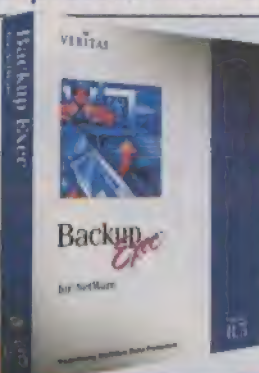
- Intelligent Disaster Recovery
- Open File Agent (supports GroupWise)
- Oracle Option

(94368)

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\$795



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v8.5 Multi Server
Full Version

Including Agent Accelerator for NetWare & NT

PLUS

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- Open File Agent (supports GroupWise)
- Oracle Option

(94370)

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Only

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Retrospect® Backup for Windows

Retrospect

Express Backup



The easiest,
most reliable
personal
backup

(98456)

\$109

Retrospect Express Backup makes it fast and easy to back up, restore, and archive. With an interface that's easy to navigate and backups that can be accomplished in a few quick steps, Retrospect Express eliminates the hassle and inefficiency of dragging files from one volume to the next. Features include:

- **Easy, automated backups:** Backups launch automatically to run unattended on any schedule.
- **Reliable one step restores:** Restores an entire hard disk in a single step even after multiple incremental backups
- **Device Support:** Simplifies Installation by immediately recognising your backup device and automatically loading the appropriate driver.
- **Compression and Encryption:** Dramatically improves storage media capacity and decreases media costs.
- **IncrementalPLUS Technology:** After the initial backup, Retrospect Express backs up only new or changed files, saving time and storage media.

Retrospect

Desktop Backup



The best
backup
software for
any storage
device

(88034)

\$332

Retrospect Desktop Backup is the ultimate tool for backing up a single workstation to any storage media. It combines performance, unattended operation, low administration costs, and a complete feature set within an intuitive interface. Retrospect Desktop Backup builds on the features of Retrospect Express Backup with:

- **Expanded Device Support:** Supports most tape drives/autoloaders up to 8 slots
- **Network Ready:** Adds support for another 5, 10, 50, or 100 networked computers to your copy of Retrospect Backup with Retrospect Clients
- **Compression and encryption:** Dramatically improves storage media capacity, decreases media costs. Provides security for confidential files.
- **IncrementalPLUS™ technology:** After the initial backup, Retrospect backs up only new or changed files, saving time and storage media.
- **Duplicates:** Performs immediate or scheduled copying of any local volume, network volume, or folder to any other.
- **Archiving:** Store little-used files onto media to reduce free up hard disk space.
- **Expanded Device Support:** Supports most tape drives/autoloaders up to 8 slots

Retrospect

Workgroup Backup



The best, most
reliable backup
for your
workgroup and
server

(88087)

\$676

Retrospect Workgroup Backup provides powerful backup for your entire workgroup across the network to a single storage device. Integrate both desktop computers and notebooks who connect to the network at irregular times into the same backup schedule. Includes all the features of Retrospect Desktop Backup listed above, plus:

- **Central administration:** One person can manage all backup functions; eliminates lengthy user training and difficult installation at each workstation.
- **Backup Server™:** Determines which computers are most in need of backup and backs them up in order of priority, including notebooks.
- **Advanced security:** Prevents unauthorized access to sensitive data with password protection while retaining individual user's privacy. Encrypts network transfers for additional security.

INCLUDES THE RETROSPECT APPLICATION PLUS 20 CLIENTS

Retrospect

Server Backup



The best, most
reliable backup
for your entire
network

(88088)

\$999

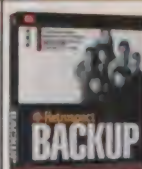
Retrospect Server Backup includes all of the features found in Retrospect Desktop Backup and Retrospect Workgroup Backup, as well as advanced networking capabilities.

- **Powerful networking:** Uses your existing network configuration to back up clients on any subnet. Includes powerful subnet broadcast and direct IP access for multi-network environments. INCLUDES THE RETROSPECT APPLICATION PLUS 100 CLIENTS

"Retrospect 5.0 Server Edition proved itself in every test... it earns a recommendation from the CRN Test Center." *Computer Reseller News*

"Dantz backup system's flexibility, easy of use should make it a winner...it might well become an overnight sensation." *PC Week*

"Retrospect has several unique technologies that differentiate it from other backup products.... an excellent package." *IT Graphics*



Retrospect Clients

Adds support for more networked computers. With the addition of cross-platform Retrospect Clients, use Retrospect to back up your whole network, including Windows 95, 98, NT 4.0 Workstation & Server, Mac and Windows 2000 computers.

Back up any client-equipped computer on the network without installing file servers, starting file sharing, or mounting volumes.

5-pack:
(88260)

\$257

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(88261)

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Get the Reporting you need with Seagate Crystal Reports:

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Combine Ease-of-use, flexibility and power to deliver the ultimate in presentation-quality reports.

- From basic reports with simple charts and graphics to comprehensive reports that include subreports and gigabytes of corporate data, Seagate Crystal Reports makes it easy to present a compelling view of your business data.
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- As your reporting requirements become more complex, increased reporting power is critical.
- With Seagate Crystal Reports 8, report processing has never been faster, or more efficient.

Crystal Reports Professional



Crystal Reports Pro 8	(95574)	\$569
Crystal Reports Pro 8 5 User	(95575)	\$2,230
Crystal Reports Pro 8 Upg	(95603)	\$307
Crystal Reports Pro 8 5 User Upg	(95605)	\$1,265

Crystal Reports Developer



Crystal Reports Dev 8	(95576)	\$708
Crystal Reports Dev 8 5 User	(95578)	\$2,765
Crystal Reports Dev 8 Upg	(95724)	\$373
Crystal Reports Dev 8 5 User Upg	(95602)	\$1,446

Other software Full Version/Upgrade products available. Please call for pricing and information

Borland

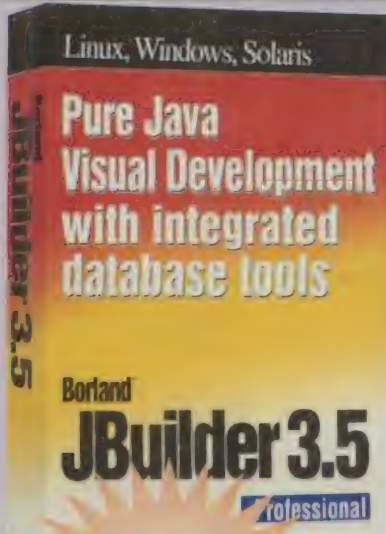


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Development Tools

JBuilder 3.5



(98247)

\$1129

JBuilder 3.5 uniquely delivers the key features required for productive Java development, including:

- Unrivalled support for the Java 2 platform to deliver the most reliable, scalable, and performant Java solutions.
- Visual tools and reusable components for rapidly creating platform-independent client/server applications, servlets, and applets.
- Completely integrated and automated CORBA support, including the industry's leading VisiBroker CORBA ORB, dramatically reducing the time and effort required to develop and deploy robust, high-availability CORBA clients, servers, and servlets.
- Components Wizards and designers for creating reusable

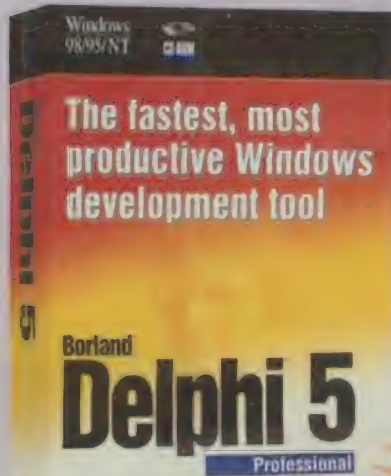
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Delphi 5

Delphi 5 is the fastest, most productive Windows development tool for building Web and database applications. Delphi includes a professional IDE, WebBroker, Native Internet Components, InterBase Express, and robust debugging tools. Understand and navigate your code and data modules with the Project Browser, Code Explorer, and Data Module Designer views. Visually build components for your business with Frames. Build and reuse COM objects and servers, including a complete suite of MS Office automation controllers. Delphi increases productivity and manages the entire development cycle with over 150 reusable components, the Advanced Project Manager

and the world's fastest 32-bit compiler to deliver reliable applications to market faster



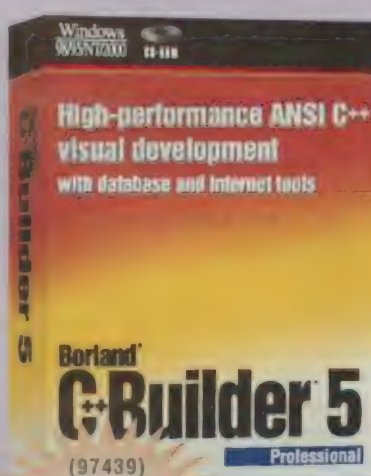
(81258)

\$1055

C++ Builder

C++Builder 5 Professional combines the most powerful C++ Windows development environment for building desktop and database applications with native Internet components for building high-throughput Web applications. C++Builder increases productivity and manages the entire development cycle with over 150 reusable components, the XML Based Project Manager and a true ANSI/ISO C++ high-speed 32-bit optimizing compiler to deliver reliable applications to market faster. C++Builder includes a professional IDE, WebBroker, Native Internet Components, InterBase Express, and robust debugging tools. Use the CodeGuard™ run-time error detection tool to easily

locate and diagnose memory and resource leaks on the spot. Understand and navigate your code modules with the Browser, Code Data Module Designer build components for Frames. Build and servers, including Office automation



(97439)

\$1299

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(81261)
\$350

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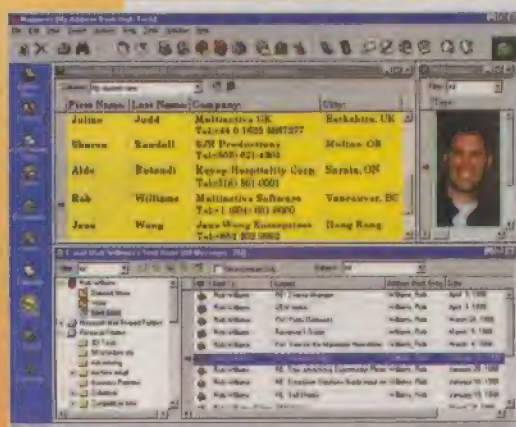
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Manage Customers. Maximize Growth.
Do Business over the Net

TrackerMaximizer has always helped people to manage customer information to their best advantage. Now **TrackerMaximizer 5.0** will increase your lead even further, enhanced by over 70 new contact management, workspace, scheduling and reporting tools for the small business user.

(70629)

\$285

Features and Benefits

- Track every detail about your customers, prospects and vendors
- Stay in contact through mail, telephone, fax, E-mail and the Web
- Manager your time and schedule effectively
- E-Commerce - Create a professional Web site and start accepting orders and inquiries on-line! The information is automatically entered into your TrackerMaximizer database, so you'll never miss an order
- Custom Report Writer - Analyse contact information quickly and easily manage all of your electronic correspondence
- Related Entries - Link previously unrelated contacts for efficient project management
- Company Library - Store sales and marketing information in a central location
- Campaign Planner - created automated plans for complex and recurring tasks
- View Free Time and Peg Board - Schedule group Meetings and view users' whereabouts
- World Clock - Work efficiently with international contacts by knowing the time anywhere in the world

ecBuilder Pro 4.5

Sell on the Web in under an hour

ecBuilder is an easy to use and powerful Web site creation and management tool which enables small business users to create an e-commerce enabled Web site with requiring technical or design skills.

With ecBuilder Pro 4.5 you can:

- Easily create an e-commerce Web site for your small business
- Automatically promote your small business to search engines
- Customise your on-line store with any image or video
- Add media Files and banners to your Web site
- Host your on-line business with any Internet Service Provider
- Accept credit cards and complete e-commerce transactions
- Accept multiple product orders with a built in shopping cart
- Start Selling on the Web today!

Key Features:

- Simple, Easy Interface.** The Wizard interface lets you build and preview your commerce-capable Web site directly from your own desktop
- No HTML Necessary.** Because ecBuilder does all the work, there's no need to learn how to program in HTML, and no need to learn other designs and scripting tools
- Professionally Designed Templates.** ecBuilder currently offers over 500 combinations of professionally designed templates that feature clear navigation, low file size and effective design
- Individual Site Identity.** Easily add your company's logo, images, captions, audio and video files to you site
- Easy to Customise.** For advance users, ecBuilder will allow you to directly enter custom HTML and links to URLs outside of your own site
- Easy to Immediate Web site upload.** With one click ecBuilder lets you host your Web site at any Internet Service Providers you choose

(98078)

\$410



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**NEW
VERSION**

(97753)

\$1,785



Freehand 9

The Professional Illustration and Layout Solution for Print and Web

With advanced new illustration tools, support for publishing to Flash 4, and built-in HTML and optimised bitmap export features, FreeHand raises the bar for Web and print graphics. Express your ideas with breakthrough creative tools, such as perspective grids for accurate 3D effects, live enveloping, vector transparency and multi-page layout.

(95113)

\$759



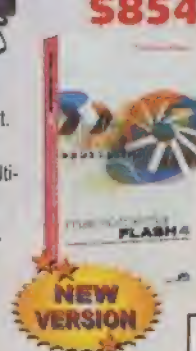
Flash 4/FreeHand 9 Studio

The Complete Cross-media Publishing Solution

From concept to completion, FreeHand and Flash provide the tools for high-impact Web development. Design graphics and site concepts in FreeHand, using industry leading creative tools, including multi-page layouts, 3D perspective grids and vector transparency. Then, integrate the images in Flash, fusing vectors, bitmaps, animation, form input and interactivity into a complete Web Site. Upgrade now and receive the Macromedia Flash 4 Training video FREE (valued at \$49.95).

(95112)

\$854



Web Design Studio

The Complete Solution for your Web Design Needs.

With Dreamweaver, Fireworks, and Flash, the Web Design Studio is designed to give you everything you need to develop dynamic, professional Web Sites quickly. Transform graphics and code into completed Web Sites in record time with Dreamweaver. Design buttons, animations and page comps with Fireworks, and add high-impact interactivity with Flash.

(70659)

\$915



Dreamweaver 3

The Solution for Professional Web Site Design & Production.

Build great looking sites in record time with total control over code. New in Dreamweaver 3:

- Support for Microsoft Office files includes a command to "Clean up Word HTML" removing word-proprietary tags
- History Palette lets you automate Web production by recording every move and saving steps as reusable commands
- Quick Tag Editor lets you quickly view and edit source HTML at the object level without having to launch the HTML inspector

(88049)

\$485



Fireworks 3

The Solution for Professional Web Graphics Design and Production.

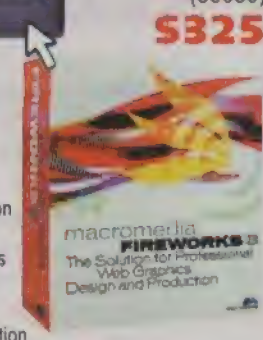
Fireworks 3 makes creating Web buttons, animations and page comps quick and easy.

New in Fireworks 3:

- Preview all your graphics and optimisation in your work space
- Reuse graphics; store buttons, animations and objects in your Library, then drag and drop them into your document
- Use the History panel to record every action & save easily as reusable cross-platform commands

(88050)

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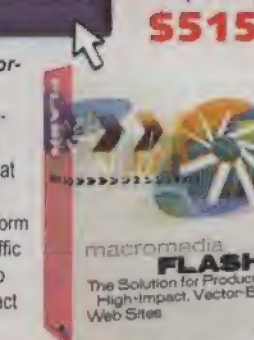
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(89252)

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(97878)

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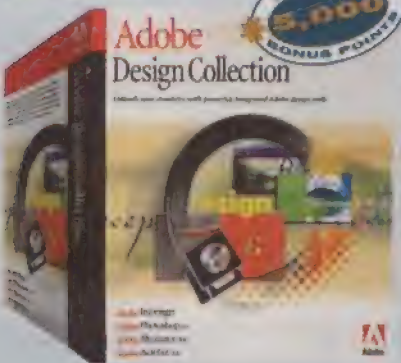
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(81011)

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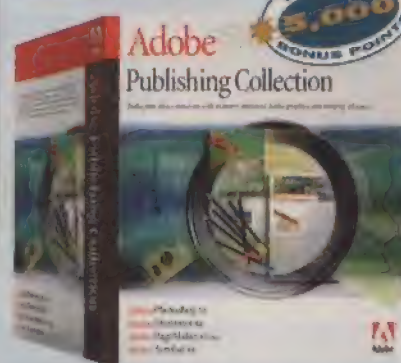
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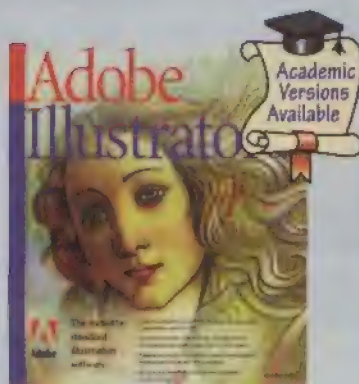
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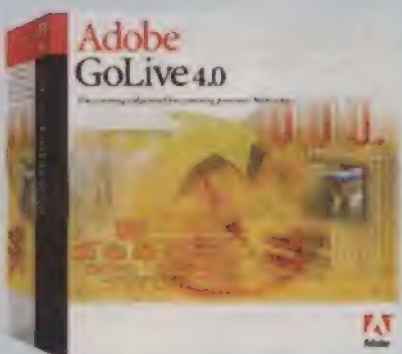
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(67039)

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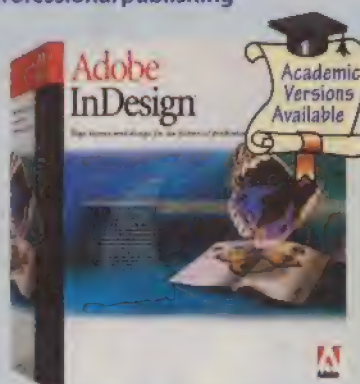
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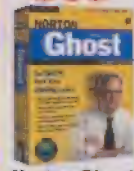
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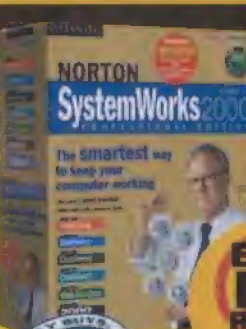
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(97684)

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(96427)

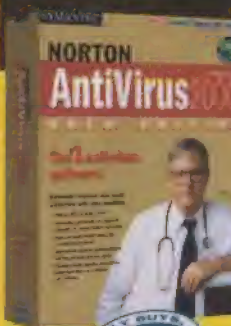
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- Monitors your systems in the background to prevent virus entry
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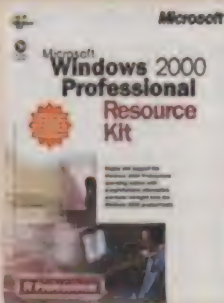
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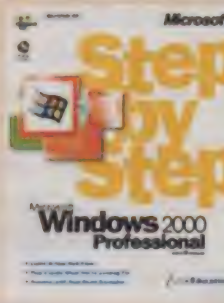
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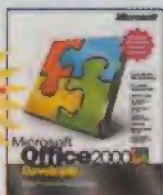
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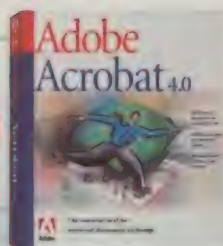
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Peter Webb
Managing Director

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- 5ppm mono, 3.8ppm colour

SAVE \$85 OFF RRP

NEW \$309

Websearch: EPS1309



EPSON Stylus Photo 700

A4 photo reproduction quality for the home

- 1440 x 720 dpi
- Delivers photographic colour and black text
- Can print A4 photo in under 5 min

SAVE \$70 OFF RRP

ONLY \$415

Websearch: EPS112



EPSON Stylus Color 760

State of the art inkjet printer - for advanced home and SOHO users

- 1440 x 720 dpi
- 7ppm mono, 6.8ppm colour text
- 3.6ppm - text and photo

SAVE \$85 OFF RRP

REDUCED \$470

Websearch: EPS172



EPSON Stylus Color 900

Inkjet printer for busy professionals and individual power users

- 1440x720 dpi
- 12ppm mono, 11.7ppm colour - text
- 10ppm text + colour graphics

SAVE \$110 OFF RRP

BEST SELLER \$775

Websearch: EPS175



EPSON Stylus Color 1160

For A3+ (A3 full bleed) printing

- 1440 x 720 dpi
- 9.5ppm mono
- 9.2ppm colour

SAVE \$193 OFF RRP

NEW \$795

Websearch: EPS304



EPSON EPL-5700 Laser

Compact, entry level laser printer

- 600 or 300dpi with BIRITech
- 1200dpi class with Microgrey
- 8ppm print speed
- Exceptionally easy networking capabilities

SAVE \$121 OFF RRP

EXCEPTIONAL \$859

Websearch: EPS355



EPSON Stylus Color 3000

The EPSON Stylus COLOR 3000 is a high-performance wide-format A2 colour inkjet printer for professional desktop publishing, pre-press graphic designers and CAD users. You can think big with the EPSON Stylus COLOR 3000 - right up to A2 size (maximum print width 410mm).

From CAD printouts to posters and banners, they're yours in glorious colour.

- 1440 x 720 dpi colour

* While stocks last

Includes photoshop 5.0*

NEW \$2185

Websearch: EPS136



EPSON Ink & Toner Cartridges

Stylus Color 760/740/1160

Black Ink S020189	EPS333	\$45
Colour Ink S020191	EPS335	\$45

Stylus Color 670/460

Black Ink S020187	EPS334	\$39
Colour Ink S020191	EPS335	\$45

Stylus Color 900

Black Ink T003011	EPS352	\$55
Colour Ink T005011	EPS353	\$63

Stylus Photo 700

Black Ink S020093	EPS069	\$39
Colour Ink S020110	EPS145	\$45

Stylus Color 1520

Black Ink S020108	EPS304	\$45
Colour Ink S020089	EPS303	\$45

EPL-5700 Laser

Toner S050010	EPS349	\$195
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Stylus Color 3000

Black Ink S020118	EPS166	\$115
Cyan Ink S020130	EPS167	\$115
Magenta Ink S020126	EPS171	\$115
Yellow Ink S020122	EPS169	\$115



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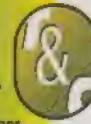
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Monday to Friday
10.00am - 3.00 pm (EST) Saturday



Terms & Conditions
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Canon BJC-2000SP

The budget printer that's big on performance!

The Canon BJC-2000SP has a compact new desktop design, perfect for those with limited space on their desk. A4-colour printer with 720 x 360dpi resolution, it produces high quality printouts in both black and white and colour. The software contains an Optimiser mode that automatically corrects image colour, exposure and saturation to ensure a great print every time!

- Easy and speedy
- Amazing print quality
- Masses of media options
- Super economy
- Use it as a scanner
- Make your own banner



SAVE \$75 OFF RRP

\$169

NEW Websearch: CAN252

Canon BJC-80

Uses half your briefcase not half your desktop!

- Office laser quality finish and B&W speeds up to 4.5 pages per minute
- Better Internet images with Image Optimiser.
- Infrared port for cable-less communications.
- Optional scanner head for colour graphics, OCR and faxing.
- Fits in half a briefcase, weighs only 1.4kg!
- International warranty included with purchase.



\$335

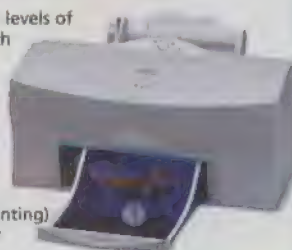
Perfect for Notebook Users

NEW Websearch: CAN001

Canon BJC-7100

- 7-colour ink system and up to 25 levels of tonal gradation for incredibly rich photographic half-tones.
- 90 times more colour combinations than conventional CMYK inks.

- Superior plain paper performance.
- P-POP (Plain Paper Optimised Printing) gives plain paper a coated paper quality finish for better looking output.
- Better colour on plain paper
- 99.4% water fast



\$499

NEW Websearch: CAN100

Canon BJC-50

The BJC-50 is as fast as a desktop printer in B&W, and also delivers brilliant full colour quality. The rechargeable battery lets you work away from mains power. The infrared interface means you don't even need a cable when printing from infrared-equipped notebooks or PCs. And the optional scanner cartridge enables fax, OCR and image editing with the appropriate software. Weighs only 900 grams, including the battery (included with purchase).

- Smaller size, bigger performance
- Desktop printer quality & speed
- Mobile office in your pocket



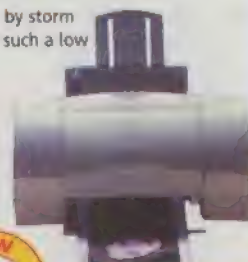
\$595

NEW Websearch: CAN200

Canon BJC-3000

The BJC-3000 is set to take the market by storm due to its impressive list of features at such a low price:

- 1440 x 720 resolution allowing sharp text, brilliant colour and exceptional photo quality
- 9 ppm (black) and 4ppm (colour)
- PhotoRealism
- Separate ink tanks
- USB and parallel interfaces



\$265

NEW Websearch: CAN200

Canon BJC-6000

The best value all purpose printer around!

The Canon BJC-6000 produces photo quality printouts, has an economy mode to reduce the cost of printing, and can print up to 8 pages per minute in black and white and 5 pages per minute in colour. The separate replaceable ink cartridges give better value for money. And it's under \$400! Using the optional USB interface cable, this printer is compatible with both PCs and iMacs.



JUST **\$350**

NEW Websearch: CAN245

Canon LBP-800

Another breakthrough from Canon - A laser printer for just \$549!

The Canon LBP-800 has all the features of more expensive laser printers, at a much more affordable price. With a 125 page multi purpose tray, convenient face up or face down paper delivery and a print speed of up to 8 pages per minute, this truly is a fantastic value printer.



SAVE **\$80**

\$549

NEW Websearch: CAN150

Canon LBP-1760

Workgroup Laser

The LBP-1760 delivers full 16 PPM A4 (17 PPM Letter size) engine speed at 600 x 600 dpi. Faster printing means less time waiting in print queues. The high-precision controller can deliver true 1200 x 1200 dpi resolution and Automatic Image Refinement can smooth text and graphic line edges up to 2400 dpi.



\$1999

NEW Websearch: CAN250

HP DeskJet 610C

Easy everyday printing plus optional photo colour

- 5ppm black, 2.5ppm colour
- 600dpi black, 600 x 300 dpi colour
- Easy set up & operation
- Great quality colour printing
- Compact and space saving

Save
\$46
OFF RRP



ONLY
\$199

Websearch: HWP405

HP DeskJet 810C

Superb print quality, & simplicity

- 6.5ppm black, 4.5ppm colour
- 600 dpi black, PhotoREt II colour
- Ultimate photo quality
- Fantastic value

Save
\$38
OFF RRP



\$295

Websearch: HWP418

HP DeskJet 880C

The HP DeskJet 880C brings all colour photos and elegant types to life

- 8ppm black, 5ppm colour
- PhotoREtII colour layering technology
- Outstanding print quality, speed and versatility
- Prints on T-Shirts



JUST
\$450

Websearch: HWP355

HP DeskJet 970Cxi

Best photo quality plus premier business printing

- 12ppm black, 10ppm colour
- 600 dpi black, PhotoREt3 colour
- Network capable
- Super fast and super quiet

Save
\$121
OFF RRP



\$745

Websearch: HWP411

HP OfficeJet 635

All-in-one print, copy, scan in colour, & fax

- Print, copy, scan & fax
- Print 5ppm black, 2ppm colour
- Print 600 dpi black, 600 x 300 dpi colour



\$575

Websearch: HWP309

HP DeskJet 1120C

Wide-format capability at an affordable price

- A4 - 6.5ppm mono, 4.5ppm colour
- A3 - 4ppm mono, 1.5ppm colour
- 600 dpi black, PhotoREt II colour
- Network capable

AS
Printing!



\$749

Websearch: HWP412

HP OfficeJet T65

Advanced performance for all office comms with easy to use features

- Printer:
- 600 x 600 dpi
 - 11ppm mono, 8.5ppm colour
- Scanner:
- 300 x 600dpi. 1200dpi enhanced, 24 bit col, 8 bit greyscale.
 - Copier with 25-400% digital zoom
 - Fax with 75 page memory and auto redial



\$945

Websearch: HWP417

HP LaserJet 2100

Vesatile laser printer for small workgroups and individuals with advanced printing needs

- 10ppm black
- 1200 x 1200 dpi
- 300 sheet paper tray
- 2 standard paper trays
- Easy network connectivity

Save
\$289
OFF RRP



\$1345

Websearch: HWP414

HP LaserJet 3150

The LaserJet 3150 is the Professional All-in-One

- Print, scan, copy and fax
- 6ppm at 600dpi
- Scan-ahead-to-memory capability
- One touch scan-to-email functionality



\$1350

Websearch: HWP428

HP OfficeJet T45

- Print, copy, scan & fax in colour
- Print 9ppm black, 6.5ppm colour
- Print 600 dpi black
- PhotoREt II colour



\$855

Websearch: HWP416

HP OfficeJet R65

- Print, copy & scan in colour
- Print 11ppm black, 8.5ppm colour
- Print 600 dpi black, PhotoREt II colour



\$1119

Websearch: HWP415

HP Ink & Toner Cartridges

HP DeskJet 610C

Black Ink C6614AA	HPI028	\$36
Colour Photo Ink C1816AA	AUC114	\$65

HP DeskJet 810C

Black Ink C6615A	HPI027	\$35
Large Tri-colour C1823G	HPI023	\$65

HP DeskJet 880C / 895Cxi / 1120C

Large Black Ink 51645AA	AUC122	\$59
Large Tri-colour Ink C1823D	HPI025	\$69

HP DeskJet 970Cxi

Large Black Ink 51645AA	HPI017	\$59
Tri-colour Ink C6578DA	HPI026	\$69

HP LaserJet 1100

Black Toner C4092A	HWP001	\$99
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HP LaserJet 2100

UltraPrecise Toner C4096A	HWP002	\$175
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HP OfficeJet 635

Black Ink 51629AA	HPI008	\$59
Colour Ink 51649AA	HPI015	\$65

HP OfficeJet T45

Large Black Ink 51645AA	HPI017	\$59
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HP OfficeJet R65

Large Black Ink 51645AA	HPI017	\$59
Large Tri-colour Ink C1823DA	HPI025	\$69



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• International*



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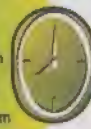
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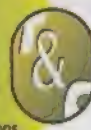
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FS-680

All lasers are not created equal

Kyocera has re-defined laser printer design to avoid the frequent replacement of the drum and the developer. When a Kyocera ECOSYS printer runs out of toner, that's all you replace. It not only costs less, it causes less harm to the environment too. The FS-680 offers the perfect printing solution for the home office, small business or personal printing requirement.

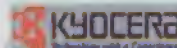
Print speed	8ppm
Resolution	600dpi enhanced to 2400dpi
Standard emulations	HP PCL 5e
Processor	50 MHz Power PC
Standard / maximum memory	4 / 36Mb
Standard paper input	150-sheet cassette
Maximum paper input	400 sheets, 2 sources
Consumer yield	3,000 A4 pages @ 5% coverage
Duty cycle	5,000 pages / month

Save \$134 OFF RRP



BEST SELLER
\$595

Websearch: KYOC68



FS-1200

A4 entry level network laser printer

Introducing the FS-1200 - a 12ppm laser printer that continues the award winning entry level tradition of the FS-680, and comes with a three year, return to base warranty. The FS-1200 is not your normal entry level laser printer - it features a powerful 71MHz processor, 4Mb RAM (upgradable to 68 Mb) and one of the lowest costs per page in its class. The FS-1200 uses a purpose built toner only cartridge (TK-25) which yields 5,000 pages @ 5% coverage. What really sets the FS-1200 apart is its ability to be upgraded with extra paper feeders and a duplex unit, unparalleled in an entry level model.

- 12ppm entry-level network printer
- 600 x 600 dpi resolution, upgradable to 2400dpi
- 4 Mb RAM (upgradable to 68 Mb)
- 250 sheet paper feeder
- Full SNMP connectivity support
- A variety of emulations, including PostScript Level 2 emulation as standard
- Three year or 100,000 page* return to base warranty
- 71 Mhz PowerPC CPU
- Low cost per page printing

* Whichever occurs first

FREE Full Version QuickBooks v7 Worth \$190 while stocks last



NEW
\$1239

Websearch: KYOC12

Kyocera FS-680

Toner TK-16 KYO020 **\$93**

Kyocera FS-1200

Toner TK-25 KYO023 **\$129**

Don't forget to check if you need a cable for your printer

Tektronix Phaser 850

Laser technology has long been associated with fast, easy, high quality black and white office printing. Applying laser technology to colour printing however adds a surprising level of complexity in both printer design and operation. In fact, it is not laser but another printer technology that comes closest to fulfilling the needs for fast, reliable high quality colour that is simple to operate in any office environment. Tektronix breakthrough high-performance solid ink technology offers a number of advantages over colour laser technology. This technology has been designed for colour printing from the beginning and is not merely an adaptation of a monochrome process. It provides high print quality while addressing the real-world needs of busy office workgroups who want to add colour to their existing black and white printing resources.

Easy to use:

- Control panel - The 850's intuitive front panel gives continuous updates on printer or current print job status, you can access printer settings and cancel printing anytime.
- Reserve capacity - Drop an environmentally friendly ink stick into the printer anytime without it leaking or spilling in the process.
- Powerful remote control - Access print jobs, check supply levels and cancel printing without ever leaving your desk.
- Next-generation print drivers - get more print options and the ability to preview them on-screen.

Flexible:

- Flexible paper handling: Add up to two 500-sheet, lower trays for print capacity up to 1200 pages.
- Two-sided printing: With fast automatic two-sided print speeds, the 850 only produces beautiful two-sided printing
- Variety of print media: The 850's high-quality colour looks as vibrant on all types of paper. Tektronix also offers a full line of paper and printing media formulated for optimum image quality and reliable printing.

Low cost:

- Real world reliability: when compared to colour lasers, the 850 has fewer parts of wear out and uses fewer consumables that need to be replaced. This means a low cost of operation, ease of use and reliability for your workgroup



\$5729

Websearch: TEK850

Outstanding Technology

Model	Resolution	Ram	Processor	Speed/Photo	Built in HD	Job Accounting	Paper tray	Code	Price
Phaser 850N	800dpi	32/256	200mhz	14 ppm/8ppm	optional	50 jobs	200 sheets	TEK001	\$5729
Phaser 850dp	1200dpi	64/256	200mhz	14 ppm/8ppm	optional	500 jobs	200 sheets	TEK002	\$7289
Phaser 850dx	1200dpi	128/256	200mhz	14 ppm/8ppm	6GB Disk	5000 jobs	200 sheets	TEK003	\$9779

Phaser 740
\$4699

Websearch: TEK005

Phaser 740L
\$3699

Websearch: TEK006

Okipage 6W

The economical answer to your personal printing needs. At a speed of 6 pages a minute and at the affordable price for everyone, the OKIPAGE 6W is the perfect answer to personal printing needs, at home, in corporate environments or in education. The design standards are high, the build standards are excellent and the printed results are superb.

- Small footprint
- 600dpi class
- 100 sheet standard
- Low cost of ownership



Comes with FREE Corel Draw Select Software
* while stocks last

\$399

Websearch: OK1023

OKI
People to People Technology

Okipage 8P

The OKIPAGE 8P is the best value for fast, professional looking output for your business. It's the easiest, most affordable way to get superior digital LED performance. Simply connect your printer to your bi-directional cable and install the printer software. You can then control your printer directly from your PC through a point and click operations.

- 8ppm
- 13 seconds to first print
- 600 x 1200 dpi resolution
- PCL6, IBM proprinter and Epson FX coresident
- 100 sheet auto pagefeeder



\$599

Websearch: OK1024

Okipage 8C Plus

The OKIPAGE 8C Plus produces true 600 x 600dpi resolution using its unique tandem engine. Its powerful memory capability ensures that it has no problem dealing with your digital images or business graphics and will provide the excellent results you require. Using OKI's Single Pass Colour Digital Technology enhanced by precise colour profiles and screens from Heidelberg, the world leader in colour printing, the OKIPAGE 8C Plus ensures effective, fast colour printing.

- 600 x 600dpi
- 25 secs to first colour print
- 4 colour management system
- 5ppm overhead transparencies
- 32MB standard/144 MB
- 500 sheets capability standard
- 8ppm colour or mono
- Heidelberg colour matching
- Unique colour tandem engine
- PCL5c/PSIII standard



Comes with FREE Corel Draw Software
* while stocks last



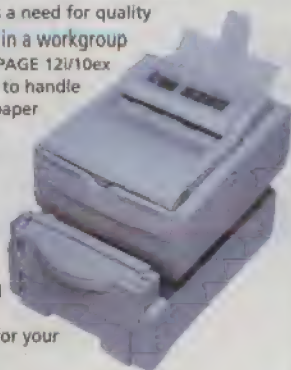
\$6115

Websearch: OK1031

Okipage 12i/10ex

Wherever there is a need for quality printing at speed in a workgroup situation the OKIPAGE 12i/10ex is ideal. Its ability to handle a wide range of paper sizes and a large volume of paper stock make it capable of creating crisp correspondence, sharp presentations and eye catching communications for your workgroup.

- 600 x 1200 dpi
- 250 sheet standard (optional 500 sheet tray)
- True Adobe Postscript II



- 12i**
- 9 sec to first print
 - 12 pages per min
 - 4 MB

- 10ex**
- 12 sec to first print
 - 10 pages per min
 - 2 MB

\$990

\$730

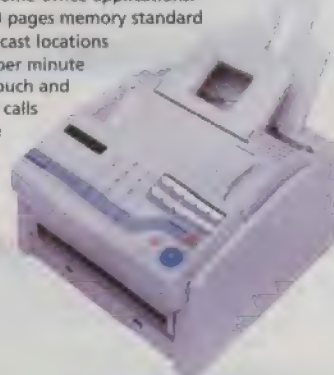
Websearch: OK1025

Websearch: OK1026

Okifax 4100

The OKIFAX 4100 is a compact, high quality desktop LED plain paper fax that brings a wealth of professional features to the desktop. Offering the reliability and quality of LED technology, a rapid transmission speed, memory and auto-dialling features, this compact machine is ideal for small and home office applications.

- 256KB/20 pages memory standard
- 56 broadcast locations
- 4 pages per minute
- 10 one touch and 45 speed calls
- 100 page paper capacity



\$985

Websearch: OK1027

Okifax 4500

The OKIFAX 4500 is a compact high quality desktop LED plain paper fax that is ideal for small and home office applications. It can perform as a fully multi-functional product. It offers a host of professional features that include rapid printing and transmission speeds, memory and dual access.

- 1MB/200 pages memory standard
- 85 broadcast locations
- 8 pages per minute
- 10 one touch and 70 speed calls
- 250 page paper capacity
- scanning (600dpi, min 6 sec/pg)



\$1150

Websearch: OK1028



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Free Gift
Make sure to ask for your free gift when ordering.



Fast Delivery
Full range of delivery options:
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• Next day*
• International*



Massive Range
We aim to stock at least 95% of ALL the items we sell



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princo

SPECIAL

The PRINCO range will cover all media requirements from standard 74min and 80min media to specialised Music CD's, bulk Spindle packs and RW CDR media.



- 74Min/650MB
- Silver-Blue recording surface
- 12x recording certified

Price 3452
\$2.25

10 pack @ \$22

Websearch: PR007



- 80Min/700MB
- Silver-Blue recording surface
- Ideal for full audio CD's

Price 8058
\$5.95

10 pack @ \$58

Websearch: PR007



- 74Min/650MB
- Silver-Blue recording surface
- Designed for audio & HiFi CDR's

Price 745V
\$5.95

10 pack @ \$54

Websearch: PR007



- 80 min Audio

Price 80MU
\$6.95

Websearch: PR007



- 74Min/650MB Spindle
- 50 discs per spindle
- 12x recording certified

Price 345V 50
\$79

Websearch: PR007



- 74Min/650MB Spindle
- 6x100 discs per spindle
- 12x recording certified

Price 1112 100
\$990

Websearch: PR007

MITSUBISHI

50X CD-ROM

50 Speed CD-ROM Drive Hits the Market

Features

- Interface - UDMA E-IDE ATAPI
- Data transfer rate - Up to 7.5Mb/sec @ 50x max
- Disc loading mechanism - Motorised tray-load
- Access time - 100ms
- Buffer size - 128 Kbytes
- Warranty - 12 months
- Low disc vibration
- Multi-read compatible (CD-RW)
- CD Play button for software-free CD playback



50X

ONLY
\$99

Websearch: MT014

MITSUBISHI

30X6X4X CDR-RW

Introducing Mitsubishi's new 30x4x4 CDR-RW retail kit.

This kit includes:

- 30x CD-Rom Read Performance
- 6x Write to CD-R and CD-RW Media
- 2Mb Buffer for Stable Recording
- Easy CD Creator and Direct CD
- 10 X 80 Minutes CD-R and 2 x 74 minute CD-RW blank media for free! With 12 pieces of media included, there's nothing to hold you back from starting your CDR/RW experience.



LOOK 10 CD-Rs & 2 CD-RWs Free

INCREDIBLE
\$479

Websearch: MT014

Pioneer 16x DVD & 40x CD Rom

DVD-11S Pro provides leading performance of 16X DVD-ROM and 40X CD-ROM functions. The sustained data transfer rate of DVD media is up to 15250KB/sec. By comparison, this would be equivalent to a 160X CD-ROM drive! Additional enhancements include the digital servo mechanism and CAV technology which keeps the drive on track, DDS (Dynamic Damping System) to soak up vibration thus minimizing error and to improve the stability of reading CD or DVD formats (including CD-R/RW or DVD-R/RW). The DVD-11S Pro offers a consistently high level of quality, compatibility, reliability and outstanding performance.

Key Features

- 16X DVD-ROM at up to 21600KB/sec
- 40X CD-ROM at up to 6 MB/sec
- Supported IDE / Ultra
- DMA33 and MW-DMA Mode 2
- Supported DVD and CD Formats including CD-R/RW and DVD-R/RW
- Tray Loading Mechanism



16x DVD!

Internal
\$265

Websearch: PR007

Hitachi DVD RAM

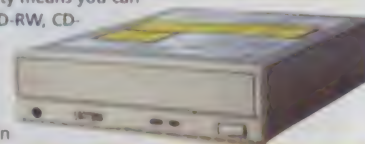
A whopping 5.2GB of storage on each disk! Great for storing large amounts of documents, images or archive data. Each disk can be read/written 100, 000+ times. Software is provided, and for a limited time get one blank DVD disk free! This drive is a SCSI device.

Transfer Rates:

- DVD-RAM: 1.38MB/s
- DVD-RAM: 2.76MB/s
- Buffer Memory: 1MB

Scsi-2 Card Required.
Total CD-ROM compatibility means you can read any CD-ROM, CD-R, CD-RW, CD-Audio and CD-Video disks, just like a CD-ROM drive. DVD compatibility.

Can open up Win 95 and Win 98 only. Drivers for Win NT and iMac available soon.



5.2GB
Storage
per Disk

Maxell DVD-RAM 5.2GB Media
HIT009.....\$119

SCSI CARDS FROM
\$99

See Page 12

NEW
\$989

Websearch: PR007

Kodak IDE CD-ReWriter Kit

Features

- 4x Writable, 4x ReWritable, 24x Read
- Disc and track-at-once recording
- New WinOnCD 3.6
- Packet CD 3.0
- Gazo Personal Imaging Warehouse
- Video CD2.0 capable
- Full in-box solution

Audio Features

- Includes 5m long HiFi connection cable
- Record to hard drive from any audio source
- De-click, EQ adjust, insert track breaks, etc
- MP3 to CD Digital Audio



SAVE
\$75
OFF RRP

ONLY
\$489

Websearch: ED0648

HP 9310i 10x4x32 IDE

The fastest internal drive for those who want the maximum performance.

- Video for easy installation for users without a spare PC slot.
- USB I/F for Plug & Play.
- 1 x HP CD-R Media
- 1 x HP CD-RW Media
- Adaptec SW
- (Direct CD, Easy CD Creator)
- Sonic Foundry ACID SW.
- Broderbund Multimedia Organiser.
- USB Cable
- CD Labeller



NEW!

\$599

Websearch: HP9310

HP 8210e 4x4x6 USB

External Plug'n'Play drive for those who want to share a CD writer

- The fastest CD Burner for users who need SPEED!!
- Ideal for Medium to Large businesses.

Free IN THE BOX !

- 1 x HP CD-R Media
- 1 x HPCD-RW Media
- Adaptec SW
- (Direct CD, Easy CD Creator)
- Corel Printhouse.
- Broderbund Multi-media Organiser.
- CD Labeller.



NEW!

\$649

Websearch: HP8210

HP 9100i 8x4x32 IDE

Incredible - 32 x 8x 4x!

Once again we have negotiated an unbelievable HP CD Writer deal!. The fastest, easiest, most reliable way to make your own CD's is 32 x 8x 4x. This is the top of the line, multimedia, multi-purpose Internal IDE CD-RW (ReWritable) drive which supports Multi-Copy, to ensure all copies are identical to the original. This package also supports 80 minute CD overburn.

- Easy installation, plugs straight into your IDE port, easily transferred between computers.
- Adaptec Direct CD & Easy CD Creator makes it easy to write data, photo, audio and video files to a CD.
- HP Disaster Recovery quickly and easily restores your hard drive files and operating system in minutes.

High performance internal IDE drive is easy to install and is up and running in minutes. Setup is easy and everything you need is already in the box. No need to buy any extra cables or adapter cards. Adaptec Direct CD - drag and drop files to CD from Windows Explorer or save directly from any application. Adaptec Easy CD Creator - create data or music CDs that you can share with most CD-ROM or audio CD players. HP Disaster Recovery - easy-to-use one-step interface lets you backup your entire computer system and restore it quickly should a disaster occur.



All this free!

- 10 CD-R's
- 1 CD-RW
- Adaptec CD Creator V3
- Adaptec Direct CD
- Broderbund Multimedia Organiser
- Corel Printhouse
- CD Labeller
- Broderbund Multimedia Organiser
- Corel Printhouse
- CD Labeller

NEW \$499

Websearch: HP9100

RICOH CDR/RW&DVD

MP9060A

6x Record 4 x ReWrite 24 x Read 4x DVD Read

All your CD business needs .. PLUS DVD entertainment!

- CD and DVD. Enjoy the best of both worlds!
- Double laser diodes in one pick up module enable CD-R/RW function and DVD-ROM function in one drive.
- Four-in-one drive saves money and slot space.
- A pick up module designed for DVD allows high precise CD-R/RW writing.
- A 2 MB buffer memory assures smooth DVD title playback even with low quality media.
- The low-power-consumption-design helps achieve class 3 million environments along with a dustproof environment.
- The drives supports S/PDIF output, 8x audio reading for stable playing back and Digital Audio Extraction at 24x.



INTERNAL IDE \$669

Websearch: RICOH

NEW!

RICOH Portable CD-R/RW

MP8040SE

Portable high-performance CD-R/RW drive

- 4x Write and 4x Rewrite
- Speedy 20x Read
- Extra-small pick-up module
- High-speed LSI technology
- Direct / CD 2.5 packet-writing software
- Easy CD Creator pre-mastering software the package comes with everything from drive unit to media. A high-performance switchable PCMCIA interface card is included that supports both 16-bit Card Bus modes.



ONLY \$815

Websearch: RICOH

RICOH Fast CD-R/RW

MP7080A

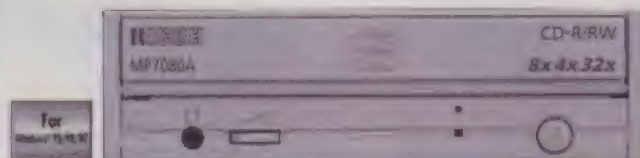
A leader in CD-R/RW, steps ahead again. An ultimate 8x4x32x CD-R/RW drive from Ricoh has arrived.

Be ready whenever the inspiration strikes, with the lightening-fast Ricoh MP7080A series. With its 8x recorder, 4x rewriter and 32x read speed, the MP7080A is the ideal tool for daily removable storage. You'll never lose a good idea again. It also comes with a quick start guide which will help you through the installation process step-by-step.

The MP7080A uses the best technology to produce high speed, stable writing and to meet the needs of demanding audio users. The MP7080A allows quicker access with the average access time around 120msec. This fast access time contributes to improving random read/write, such as FireCD packet writing and/or database quick accessing. The MP7080A series is an evolution in speed and in reliability.

"It works for me." "It works for you."

- Home use - save and update all pictures, browse any favourite web sites off-line
- Authoring - produce multimedia and interactive CDs
- Music - create your own music CD
- Backup/Archiving - ultimate backup solution, store up to 1.1 GB per disc with the reliability of optical media
- Graphics - store and update all files as often as you like
- OS- Windows 95/98 and Windows NT



ONLY \$595

Websearch: RICOH

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We will not be beaten on price!
We cut prices not corners.
see Terms & Conditions



Free Gift
Make sure to ask for your free gift when ordering.



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Full range of delivery options:
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• Next day*
• International*



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We aim to stock at least 95% of ALL the items we sell



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Terms & Conditions
All prices include Sales Tax. Prices subject to change, see page 56 for terms and conditions.



Verbatim Copysmart 4x4x32 CD Duplicator

As easy to use as a photocopier!

Stand-alone or PC/MAC connected. The one-to-one duplicator is able to record to both CD-R and CD-RW media. 4x CD-R, 4x CD-RW copy functions.
Simple 4 button interface allowing speed selection, test, copy, compare and quick erase. PC based data and audio copying software included.



JUST
\$1895

Websearch: C2R091

Verbatim CD SpeedWriter Plus 4x4x32

The Smart and Friendly CD SpeedWriter 32 is the third generation of the award-winning CD SpeedWriter. The CD SpeedWriter 32 is a 4x Write, 4x ReWrite, 32x Playback CD-Recorder with a plentiful 2MB buffer. It is particularly ideal for music and audio fans with its ability to rip music in CD Audio, MP3, MS Audio or wav formats with the included Nero CD Recording software - allowing you to create your own personal music discs. It is also ideal for data archiving and backup, disaster recovery, digital imaging, and a whole range of multimedia applications.



ONLY
\$449

Websearch: VER022

NEW!

Verbatim Datalife Plus CD-R and CD-RW discs

Verbatim CD-R and CD-RW discs encompass the latest technology for superior performance. They feature a proprietary Metal AZO dye (which offers the best protection against sunlight), multi-speed recording, scratch-resistant, protective coating, a fully printable surface and across the board writer compatibility.



New 52min
CD-R

Low Cost
Quality Media

Single CD-R
\$2.45

Websearch: VER002

Single CD-R
\$2.25

Websearch: VER003

Single CD-RW
\$6.95

Websearch: VER004

50 Pack CD-R
\$22.50

Websearch: VER006

Creative 52x CDROM With Remote Control

Creative's new generation 52x CD-ROM Drive series with build in infrared remote control receiver which delivers data access at a super-fast 52x speed. With full-featured wireless remote control for CD-ROM Playback, web surfing, business presentations and multimedia application control, this is the ideal kit for those who are looking for an innovative solution. Let your programs "fly" with the Creative 52x CD-ROM Drive.
"High Performance 52x-Speed CD-ROM Drive with Innovative Wireless Remote Control Convenience!"



Only
\$99

* Boxshot shown for illustration purposes only. OEM packaging.

Websearch: CDR001

Lowest Cost CD-R'S



Ricoh
RIC015 Ricoh CD-R 74min 1x-8x Single **\$2.50**
RIC014 Ricoh CD-RW 4x(Rewritable) Single **\$9.95**



Kodak
KOD042 Kodak CD-R 74 min 8x KSP (Screen print) **\$2.70**
KOD043 Kodak CD-R 74 min 8x NSP (No screen print) **\$2.70**

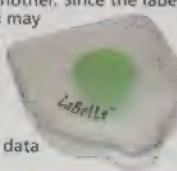


HP
HWP252 HP CD-RW SINGLE CD **\$29.00**
HPP024 HP CD-R 650MB SINGLE CD **\$3.90**

We carry a huge range of storage media

LaBelle CD Labeller

Give your CDs the professional touch. This clever yet simple labeller lets you put neat and professional looking labels onto your CDs. Labels are available for both inkjet and laser printers. Labelling a floppy disk is one thing, however, labeling a CD-ROM is quite another. Since the label on a CD must be placed exactly in the middle and may not overlap anywhere, you can either squint your eyes and hope for the best, or you can entrust the exact positioning to LaBelle. Modern CD-ROM drives with increasingly higher rotation speeds demand smaller and smaller tolerances. Through precise label centering, the Swiss made LaBelle insures that the CD spins evenly and thus data readability is not corrupted.



- CD label applicator
- CD Software (PC/Mac)
- CD Labels (1440 dpi optimised)
- Inlay Cards

...simply the best labeling system on the market. For a full range of labels visit our website at www.iswh.com.au

JetColour Pro 20 Label Pack
\$22

Websearch: LAB012

Simple To Use

Labeling 1000 CDs
\$45

Websearch: LAB010

Labeling 1000 CDs
\$25

Websearch: LAB008

Easy CD Creator 4 Deluxe

Easy CD Creator 4 Deluxe goes way beyond the software that came with your CD-Recorder, it's the easiest way to put your world on CD! Now it's easier than ever to create audio and backup CDs, access music on the internet, fine tune your music tracks, enhance photos and videos like a pro, and create your own CD labels. Easy CD Creator 4 Deluxe is the premium, all-in-one solution for CD-recording. And when it comes to saving precious memories or backing up important data, there's nothing better than a virtually indestructible CD!

New Features:

- Take Two lets you quickly, economically and safely store vital business information on CD. Supports both CD-R and CD-RW
- MP3 Music Support to access, purchase and download music from popular music web sites. Includes free authorized MP3 songs
- CD Guide is the easy-to-use interface that walks you through the recording process
- Web Checkup enables you to download the latest Adaptec software program files
- MGI VideoWave II SE for adding special effects, correcting colour and more
- Jewel Case Creator - includes new professionally designed themes
- CD labeler and blank labels for ink jet and laser printers included



Quasi for MAC
\$125

Websearch: ADA015

LOW PRICE
\$119

Websearch: ADA014

Compro PS39 Digital Video Camera-USB

COMPRO PS39 Digital Video Camera offers great convenience of plug and snap on any Windows PC or notebook. Simply connect the camera to the USB port, a quick software installation and you are ready to take a brilliant picture, or video conference at life like frame rates.

Superior features:

- 40 frames per second (video images)
- 1280 x 960 resolution at 16.8 million true colour still images
- Superior image quality without compression
- Adjustable focus Lens (10mm to Infinity)
- Low lux capability
- Plug and Snap on all PC and note-book USB ports
- Includes PS2/AT Keyboard Adaptor, removable tilt and swivel base assembly, user manual



\$289

Websearch: CMP013

Compro CDRW 4420-NB

The Compro CDRW 4420-NB is one of the world's first CD re-writers with CD recording, rewriting and reading function all in a slim 23mm height housing. Notebook users can now enjoy the convenience of CD writing and rewriting all on one single drive. Available for both USB and PCMCIA ports. Users will enjoy the unsurpassed performance of 4x CD writing and rewriting as well as 20x CD reading.

Bundled with:

- Easy CD Creator.
- Direct CD software.
- Compro 16 CD holder.
- Sample CD-Recordable Media.
- Sample CD-Re-Writable Media.
- Battery case



**UltraSlim Design
Perfect For
Notebook
Users**

PCMCIA
\$959

USB
\$959

Websearch: CMP016

Websearch: CMP015

Compro 8x4x32 IDE Rewriter Kit

This Rewriter Kit comes with Easy CD Creator Software which offers intuitive Graphical User Interface for users to easily create or duplicate CDs with full control over the parameters and formats.

The Rewriter Kit also comprises

- 8X CD Recorder
- 4X CD Rewrite
- 32X CD ROM
- IDE Interface
- Compro 16 CD Case
- Recordable Media
- Re-Writable Media
- Sample CD Recordable Media
- Cables



\$499

Websearch: CMP006

Compro DVD RAM

Many innovations have been incorporated to produce an extremely reliable, high performance storage solution. All of these innovations combine to give a single sided recording capacity of 2.6GB and a double sided capacity of 5.2GB. Additionally, the built in error correction embossed address bits, wobbled track recording and other features make DVD RAM a highly reliable media.



\$509

Websearch: CMP017

Compro DVD Player

Compro DVD Player brings superior picture clarity and smoothness of DVD movies to your TV screen with great precision. Coupled with AC-3 surround sound system from Dolby, you will find yourself involved in the movie with the realistic sound effects that engulf you. The Compro DVD Player also plays a wide range of audio-visual entertainment on CD and DVD without having to invest in multiple CD players. It includes a DVD Karaoke Disk and a microphone.



\$849

Websearch: CMP009

Compro CD Express Duplicator

Compro CD Express Duplicator No fuss operation allows users to make copies of CD's quickly without training. The built in processor identifies the type of CD loaded and determines the optimal system settings and recording speed to produce error free copies without compromise. CDs with bad scratches may still contain crucial data so while most CD ROM drives will reject the disc totally, CD Master Express's Prescan feature will map out the bad tracks and pick out the useful data. It boasts 4x IDE and 8x SCSI.

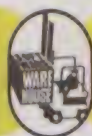


IDE/ATA
\$1299

SCSI
\$1869

Websearch: CMP018

Websearch: CMP019



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We cut prices not corners.
see Terms & Conditions



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Make sure to ask for your free gift when ordering.



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• Next day*
• International*



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No.1 Service
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10.00am - 3.00 pm (EST) Saturday

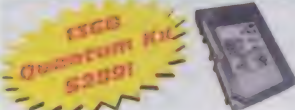


Terms & Conditions
All prices include Sales Tax. Prices subject to change, see page 56 for terms and conditions.



Quantum

Today's software requires more and more storage capacity. With a Quantum 13Gb drive costing only \$289, there has never been a better time to upgrade your hard drive.



IDE HARD DRIVE

Code	Drive	Capacity	Access Time	Price
Quantum IDE				
QUA201	Fireball LCT UltraATA/66	5.1GB	9.5ms	\$199
QUA202	Fireball LCT UltraATA/66	10.2GB	9.5ms	\$249
QUA203	Fireball LCT UltraATA/66	15.0GB	9.5ms	\$289
QUA204	Fireball LCT UltraATA/66	20.4GB	9.5ms	\$335

Seagate IDE

Code	Drive	Capacity	Access Time	Price
SEA201*	Seagate U4 UltraATA/66	4.3GB	10.5ms	\$199
SEA203*	Seagate U8 UltraATA/66	8.4GB	8.9ms	\$270
SEA205*	Seagate U8 UltraATA/66	13.0GB	8.9ms	\$309
SEA206*	Seagate U8 UltraATA/66	17.2GB	8.9ms	\$449
SEA225	Barracuda UltraATA/66	20.4GB	7.6ms	\$349
SEA226	Barracuda UltraATA/66	27.2GB	8.0ms	\$435

* includes a full retail kit, with frame, screws, brackets, wrist straps and instructions

There are many SCSI hard drives available, from 9.1Gb all the way up to a whopping 50Gb! There are also narrow, wide and ultra wide drives available. If you can't see the drive that you want, give our friendly sales team a call and they will try and source it for you. Alternatively, visit our website at www.iswh.com.au and email us your request.

Hard Drive Prices are Volatile, So Please Call or Check Our Website Before Ordering

Seagate

For faster access time, choose a SCSI hard drive. If you need a SCSI adaptor card, take a look at the Adaptec range on the bottom of this page



SCSI HARD DRIVE

Code	Drive	Capacity	Access Time	Price
Quantum				
QUA179	Atlas IV 80 PIN SCA2	9.1GB	6.9ms	\$349
QUA191	Atlas IV 80 PIN SCA2	18.2GB	6.9ms	\$955
QUA208	Atlas 10K 80 PIN SCA2	9.1GB	5.0ms	\$789
QUA209	Atlas 10K 80 PIN SCA2	18.2GB	5.0ms	\$1,239
QUA210	Atlas 10K 80 PIN SCA2	36.4GB	5.0ms	\$2,195
Seagate SCSI				
SEA229	Medalist Pro Ultra2	9.1GB	9.5ms	\$515
SEA173	Barracuda Ultra2	9.1GB	6.9ms	\$379
SEA212	Barracuda Ultra2	18.2GB	7.4ms	\$839
SEA227	Barracuda Ultra2	36.4GB	7.4ms	\$1,725
SEA214	Cheetah Ultra2	9.1GB	5.2ms	\$750
SEA228	Cheetah Ultra2	36.4GB	5.2ms	\$1,835

Lynx Tape Storage Solutions

2Gb - 4Gb Solution

- HP LynxDAT internal 2-4Gb DDS drive
- 12 (yes twelve!) 4Gb data cartridges
- 1 cleaning tape
- **SCSI Host Bus Adapter FREE**
- Cables and SCSI terminator
- NovaBack v6 Back-up software (for Win 3.1, 95, 98 and NT)
- NovaBack Disaster Recovery software
- NovaBack Virus Protection
- 3 Year replacement warranty



4GB - 8GB Solution

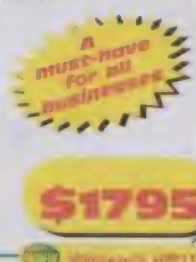
- HP LynxDAT 4 - 8Gb DDS drive (internal)
- 12 (yes twelve!) 8Gb data cartridges
- 1 cleaning tape
- **SCSI Host Bus Adapter FREE**
- Cables and SCSI terminator
- NovaBack v6 Back-up software (for Win 3.1, 95, 98 and NT)
- NovaBack Disaster Recovery software
- NovaBack Virus Protection
- 3 year replacement warranty



12Gb - 24Gb Solution

- HP LynxDAT internal 12 - 24Gb DDS-3 drive
- 1 24Gb data cartridge
- 1 Cleaning tape
- NovaBack v6 Back up software (for Win 3.1, 95, 98 and NT)
- Cables and SCSI terminator
- Mounting brackets

SCSI Host bus adaptor available



20Gb - 40Gb Solution

- LynxDAT internal 20 - 40Gb DDS-4 drive
- 1 40Gb data cartridge
- 1 Cleaning tape
- NovaBack v6 Backup software (for Win 3.1, 95, 98 and NT)
- Cables and SCSI terminator
- Mounting brackets

SCSI Host bus adaptor available



Adaptec

SCSI Controller Cards

CODE	Adaptec SCSI Adapter	Bus Type	Device Protocol	T/f rate /sec	O/S Support	Price
ADA055	AVA1505AKIT*	16-bit ISA	SCSI 1, 2, Fast	10MB	DOS, Win3.x/95/98/NT	\$99
ADA084	AHA2906KIT*	32-bit ISA	SCSI 1, 2, Fast	10MB	DOS, Win3.x/95/98/NT, MacOS	\$109
ADA049	AHA2930UKIT*	32-bit ISA	SCSI 1, 2, Fast, Ultra	20MB	DOS, Win3.x/95/98/NT	\$175
ADA085	AHA2930U2KIT*	32-bit ISA	Fast, Wide, Ultra, UltraWide, Ultra2	80MB	95, 98, NT	\$499
ADA058	AHA2940UKIT*	32-bit ISA	Fast, UltraSCSI	20MB	multiple**	\$469
ADA059	AHA2940UWPROKIT*	32-bit ISA	Fast, Wide, Ultra, UltraWide	40MB	multiple**	\$599
ADA083	AHA2940U2WKIT*	32-bit ISA	Fast, Wide, Ultra, UltraWide, Ultra2	80MB	multiple**	\$689

* Also available as card only

** Most versions of DOS, Win3.1/95/98/NT, SCO&Solaris UNIX, UnixWare, NetWare, OS/2 and OS/2 Warp

*** Fast, Wide, Ultra, UltraWide, Ultra2, Ultra160

iomega ZipStarter Kits

Just what you need to get started

Parallel port 100MB Zip drive

- Back up your hard drive
- Take your stuff with you
- Use it like a hard drive
- 4 genuine multicoloured 100MB Zip disks

- Each disk holds up to 70 floppies
- Great for multimedia
- Colours help organise
- Record it software
- For voice and music



ZIP STARTER KIT
\$245

Websearch: IOM096

Buy any iomega Zip, Jaz, Klik! or ZipCD Drive and call to claim your FREE copy of Norton Utilities 2000! This great software, valued at around \$100 works in conjunction with your iomega Drive to keep your data safe. For more information, contact the iomega Promotion line - 1300 360 947 - or www.iswh.com.au

* offer ends 31st May 2000

iomega 100MB Zip USB

The perfect companion for iMac & PCs with windows 98

- Easy to connect - just plug it into your USB port, and you're ready to go
- Hot swappable - switch with other USB devices without turning off your computer
- Compatible with 100MB Zip disks - over 100 million disks sold
- Reliable - use it like your hard drive - save your files and run your software
- Fast, unlimited capacity - add 100MB at a time



\$259

Websearch: IOM098

iomega Klik! PC Card Drive

The compact, go-anywhere storage solution

A lightweight and highly mobile removable storage drive, the Klik! PC Card Drive fits into the PC card slot of most notebook computers. It comes ready to run and with no extra cables or batteries, is easy to install and use. Klik! disks hold an amazing 40MB of information and provide the ideal low-cost, high-capacity removable storage solution for storing data on the run. The Klik! PC Card drive also includes iomega's productivity enhancing QuikSync and Copy Machine which enable users to develop a complete and reliable backup and storage solution.



CLICK PC CARD
\$259

Websearch: IOM120

iomega

Zip250 USB

The Ultra - Thin Mobile, high capacity storage solution for PC and Mac users

The latest addition to the Zip product line, the Zip 250 USB drive, offers an ultra-thin mobile design that meets the high capacity storage needs for both PC and Mac users. At 2.5cm thick and weighing just over 400g, the Zip 250 USB drive can accompany the most demanding mobile computer user. Connect the drive conveniently via the USB port, or for ultimate versatility, the Zip 250 USB/PC card drive version can be connected via the PCMCIA slot of your mobile computer. Compatible with USB-enabled PC and Macintosh systems. Requires Mac OS 8.1 or higher, Windows 95, Windows 98, or Windows NT 4.0. Zip 250 USB/PC card drive can connect via PCMCIA interface with Windows 95 or Windows 98. PCMCIA connection is host powered and does not require an external power supply. Hot plug and play, except Windows NT 4.0. Up to 900KB/sec transfer rate. Includes iomegaWare 2.1 with the latest software advancements from iomega including QuikSync instant backup utility. Compatible with both 100MB and 250MB Zip disks. Compatible with more than 150 million 100MB Zip disks shipped to date.



Also available at a great low price
IOM100Zip 250 Parallel.....**\$289**
IOM101Zip 250 SCSI**\$289**

ZIP 250 USB/PC CARD
\$389

Websearch: IOM109

ZIP 250 USB
\$310

Websearch: IOM108

iomega

Internal Retail ZIP250 Atapi

Fit a new Zip Internal drive into your home or office computer. You don't have to be a computer wizard to install this internal drive, this kit comes with everything you need to DIY. Increasingly, people have to do their work and access their stuff on more than one computer. Well, instead of fishing for the Zip power supply and disconnecting the data cable to take your Zip drive home with you (or to the office), how about adding the Zip ATAPI Internal drive to one machine and leaving your external Zip drive connected to the other computer. That way, all you're moving is rugged, reliable, genuine Zip disks. It's a great idea for the growing number of households with two computers.

- Includes:
- Internal ATAPI Zip Drive (250MB)
 - 250MB Zip disk
 - Internal power supply
 - ATAPI data cable
 - Assembled bracket for installation in 5-1/4" drive bays.
 - Welcome packet containing the Zip Internal Port Owner's Manual
 - iomegaWare CD with all the iomega software you'll need to operate your drive.



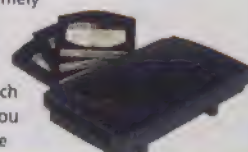
\$285

Websearch: IOM125



Who said size doesn't matter?

When it comes to multimedia, the super fast, extremely vast personal storage drive from iomega thinks it does. Jaz drives and disks offer the ideal solution for storing, transporting and playing multimedia applications. You can pack up to 2 gigabytes on each disk, and there is no limit to the number of disks you can use. Speedy access times and rapid transfer rate mean you can quickly and easily move files around. The Jaz drive can handle even the most demanding usages, including full-screen full motion videos!



IOMEGA JAZ 2GB (EXT)
\$639

Websearch: IOM083

IOMEGA JAZ 2GB (INT)
\$629

Websearch: IOM082

iomega Media & Accessories

IOM085	Zip 100MB Disk PC 1-PK	\$25	IOM073	Zip Disk Labels 20-Pack	\$3.95
IOM030	Zip 100MB Disks PC 10-PK	\$175	IOM094	Zip Card-PCMCIA to SCSI	\$199
IOM086	Zip 100MB Disk Mac 1-PK	\$25	AUP163	Jaz Traveller.....	\$89
IOM074	Zip 100MB Disks Mac 10-PK	\$189	IOM071	Jaz Carry Case	\$70
IOM099	Zip 100MB Gigacolor Disks 2-PK	\$39	IOM069	Jaz Jet ISA SCSI Card.....	\$179
IOM103	Zip 250MB Disk PC 1-PK	\$35	IOM097	Jaz 2GB Disk PC 1-PK	\$199
IOM102	Zip 250MB Disks PC 10-PK	\$319	IOM006	Jaz 2GB Disk Mac 1-PK	\$199
IOM112	Zip Drive 6 Disk Wallet.....	\$29	IOM089	Jaz 2GB Disks PC 3-PK	\$559
IOM118	Zip Tools Disk	\$15	IOM078	Jaz 2GB Disks Mac 3-PK	\$579
IOM117	Zip Tools CD.....	\$4	IOM106	Klik! Disks 2 Pack	\$65
IOM055	Zip Mini Carry Case.....	\$26	IOM107	Klik! Disks 10 Pack	\$175



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We cut prices not corners.
see Terms & Conditions



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Make sure to ask for your free gift when ordering.



Fast Delivery
Full range of delivery options:
• Same day, Sydney*
• Next day*
• International*



Massive Range
We aim to stock at least 95% of ALL the items we sell



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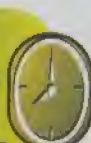
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All prices include Sales Tax. Prices subject to change, see page 56 for terms and conditions.



AcerScan 340P

Easy, sharp, vivid, high-speed home scanning at an incredible price! If you're looking for an excellent entry point to creating impressive new imaged documents and presentations, the AcerScan 340P is the productivity tool of choice.

Features:

- Ultra fast scan speed, a full page preview takes only 5 seconds
- 300 x 600 dpi optical resolution, 4800 dpi maximum resolution
- 16-Bit grayscale
- 48-bit bright colour for more than 1 billion colours representation
- 216mm x 297mm maximum scanning area
- Multilingual software bundle for easy installation and use
- 1-year Return-to-Base warranty including parts & labour
- Lifetime technical support accessible through Acer's 1-300 hotline
- Enhanced parallel port
- Compact size



SAVE \$50 OFF RRP

BEST VALUE
\$99

Websearch: ACB003

EPSON Perfection 610U

An entry level scanner ideal for the home SOHO and small business user.

The Perfection 610U produces smooth edges on line art, crisp and dark print, true colours on photos and subtle shadings, plus it allows you to scan at the touch of a button!

Features:

- 36-bit colour depth, 12 bit greyscale
- 600x1200dpi optical resolution
- 600x2400dpi max hardware resolution
- 9600 dpi enhanced resolution
- Platform support for MS Win 98, iMac, Power Mac G3 (Not win 95)
- A4 letter scan size

Bundled Software includes:

- NewSoft Presto! PageManager
- Adobe PhotoDeluxe
- EPSON PersonalCopy*
- Adobe Acrobat Reader 4.0
- EPSON Twain

* when combined with an EPSON STYLUS inkjet printer, purchased separately



Great Value
\$315

Websearch: EPS387

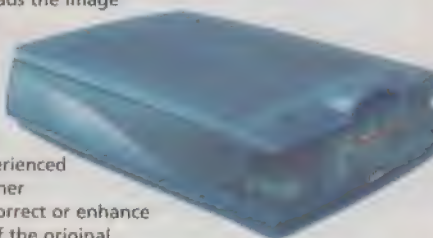
SnapScan 1212U USB

The SnapScan 1212U features greater sharpness and colour detail. Included with the scanner are the feature-rich scanning software and image-enhancement tools. Agfa FotoSnap is very easy to use.

The software reads the image on preview and automatically selects the best setting for the final scan.

Agfa's FotoLook lets a more experienced user adjust scanner parameters to correct or enhance characteristics of the original.

* Available in 3 colours



BLUE
\$259

GREEN
\$259

REGULAR
\$249

Websearch: AGS006

Websearch: AGS006

Websearch: AGS011

Canon

FB330P

For Internet and email enthusiasts

Features:

- Superslim, 39mm thick desktop design
- 300 by 600 dpi optical resolution
- Selectable resolution up to 2400 dpi
- 36 bit scanning depth
- Bundled software includes: Ulead PhotoExpress 2.0, Omnipage LE 5.1, Canon Scangear Toolbox 2.1, Canon CanoCraft Copier 3.7
- Simple parallel connection for wide compatibility



\$139

Websearch: CAN321

Canon

FB630P

For business and home users

The Canon FB630P sports all the features of the 330P, but has a higher optical resolution of 600 x 1200 dpi.



Parallel
\$189

Websearch: CAN254

EPSON Perfection 1200U

The high resolution scanning solution for home, school, small business and graphics customers

Features:

- 1200x1200 dpi optical resolution
- 1200x2400 dpi with Micro Step Drive
- 9600 dpi enhanced resolution
- 36-bit colour depth, 12 bit greyscale
- Platform support for MS Win 98, iMac, Power Mac G3
- A4 letter scan size

Bundled software includes:

- NewSoft Presto! PageManager
- Xerox TextBridge Classic
- EPSON PersonalCopy*
- EPSON Twain
- EPSON Instant Photo Print
- Adobe PhotoDeluxe
- Adobe PageMill
- Adobe Acrobat Reader 4.0



*when combined with an EPSON STYLUS inkjet printer, purchased separately

Low
\$529

Websearch: EPS004

SnapScan 1236 USB

Featuring an optical resolution of 600 x 1200 dpi (which can be interpolated to 9600) and 36-bit color depth, the SnapScan 1236 brings the small and home office user powerful image capture - yet, it is priced economically to accommodate any business. An optional 60-page automatic document feeder (ADF), and transparency option (TPO) further extend the scanner's professional capabilities



NEW
\$369

Websearch: AGS011

MICROTEK

MICROTEK ScanMaker 4

The Microtek ScanMaker 4 is both a professional quality flatbed scanner and a transparency scanner using Microtek's patented E.D.I.T. technology! Special film holders are used to scan slides & transparencies directly inside the scanner, thereby eliminating the loss of optical quality caused by glass. Compared to cheaper scanners, the ScanMaker 4 delivers better line art, better shadow detail and improved clarity especially when scanning transparencies.



- Features:**
- Patented E.D.I.T. technology
 - 36 bit colour
 - 1200 x 600 dpi optical
 - 3 light sources
 - Dynamic range 3.30
 - Includes Adaptec PCI SCSI

- Bundled with professional software including:**
- ScanWizard Pro
 - MSP ColorSync scanner profile software
 - Kodak IT8 colour calibration charts
 - Photoshop 5 LE
 - Omnipage LE OCR

pc world
BEST BUYS

\$1329

Websearch: PRO526

MICROTEK

ScanMaker X6

The Microtek ScanMaker X6 offers a sharper image, much higher resolution, superior colour accuracy and much better shadow detail compared to entry level scanners. A better scanner means you don't waste your time correcting every scan.



Features:

- 1200 x 600 dpi Optical
- 9,600 dpi Interpolated
- A4 Size
- Zero Reflection Design
- Advanced Image Enhancer
- Tri-linear CCD sensor array
- Dynamic range: 3.2
- Australian Macworld Editors Choice
- Digital Photography Magazine Editors Choice

- Low Cost Transparency Option(PRO524...\$179)
- True 36 bit colour processing (1 pass)
- Very compact
- Software bundle includes: Adobe PhotoDeluxe, ULead PhotoImpact, Photo Assistant, Omnipage LE, PaperMaster SE and ScanWizard!

PC WORLD
BEST BUYS

PC
QUALITY

USB
\$369

Websearch: PRO033

MICROTEK

ArtixScan 4000

A new price : performance level for 35mm slide scanning

4000 dpi optical resolution enables high levels of enlargement. You have plenty of resolution, whether it be for a double page spread commercial print or for an AO poster on an inkjet. Even if you don't intend to go that far, the extra resolution comes in handy when you need to crop part of the original. Even a full resolution scan only takes little more than a minute! A high dynamic range combined with fine software control ensures the Artix 4000 can handle a wide range of originals - even those with significant shadow detail. The ScanWizard Pro software allows a choice of 24 bit or 48

bit output, RGB or CMYK scanning, full 36 bit curves control, ColourSync Support, ColourSync Profiler, exposure control, batch scanning and much more. You can even save your custom settings for quick recall.



\$2695

We Are The Number 1 Choice For All Top Brands Scanners

Websearch: PRO033

HP ScanJet 5200C

HP's fast, accurate, Internet-ready colour scanner for great results every time - no experience required

Features

- HP's Intelligent Scanning Technology delivers crisp, accurate images every time
- 600 dpi optical; 600 x 1200 dpi, 9600 dpi enhanced
- On-line e-mail and web task software
- USB and Parallel Port capable
- Preview outline by region type
- Auto page format retention
- Additional software - Adobe PhotoDeluxe Business Edition, valued at \$99



CRAZY
\$369

Websearch: HP5026

HP ScanJet 3200C

Easy scanning for excellent results in only four simple steps

Features

- 30-bit internal hardware
- Supports multiple file formats
- 600 dpi optical; 600 x 1200 dpi hardware; 9600 dpi enhanced
- Includes CD with HP PrecisionScan LT scanning software with OCR and Adobe PhotoDeluxe
- Enhanced parallel interface for Windows 95 or 98
- HP Intelligent Scanning Technology optimises photos, drawings and text automatically



LOW PRICE
\$179

Websearch: HP5027

HP ScanJet 6300C

HP's fastest scanning solution for business professionals

- 1200 dpi optical; 1200 x 2400dpi hardware; unlimited enhanced resolution
- 36 bit colour
- Five buttons:scan, copy, e-mail, fax and file
- Dual I/O: USB & optional SCSI
- 35mm slide adapter
- Operating systems: Win 95, 98 & NT 4.0
- Network scanning capability
- Quick start setup poster and interactive self-guided CD



ONLY
\$749

Websearch: HP5037

HP ScanJet 3300C

The easiest to use home scanner for Windows 98

- 600dpi optical; 600 x 1200 dpi hardware; 9600 dpi enhanced
- 36-bit colour
- For PCs with USB and Microsoft Windows 98
- Convenient scan and copy buttons on the front
- HP Intelligent Scanning Technology
- HP PrecisionScan LT
- HP ScanJet Copy Utility
- Adobe PhotoDeluxe Home Edition



GREAT VALUE
\$229

Websearch: HP5038

HP ScanJet 6350C

HP's fast scanning solution for business professionals scanning for multi-page documents

The HP ScanJet sports all the features and functionality of the 6300C, but comes with the added bonus of an automatic document feeder



JUST
\$929

Websearch: HP5035

HP ScanJet 4200C

The easiest scanner for home with USB

- Dual image scanning
- 600 dpi optical; 600 x 1200 dpi hardware; 9600 dpi enhanced
- Integrated OCR
- 36-bit colour
- Scan direct to application (drag & drop)
- Guided workflow for quick results
- Front panel scan, copy and email buttons
- Easy set up with USB



JUST
\$275

Websearch: HP5034



PortStation Port Expansion System

Now there's a fast, easy way to connect your computer to networks, printers, scanners, digital cameras, the Internet and more. Access virtually anything you want with a Xircom PortStation Port Expansion System. It connects to any Windows-based computer with just one wire, through a single USB port! The great thing about the Xircom PortStation system is that you buy only what you need. Choose a Starter Kit, then add modules to complete your solution. Or build your own for the ultimate customised access system.

PortStation Starter Kits

All starter kits come with input and output end caps, AC power adapter, and USB cable.

USB Hub Starter Kit
7-Port USB Hub Module
Input & Output Endcaps
AC Power Adapter
USB Cable

\$295

Websearch : XIR067

Connection Starter Kit
4-Port USB Hub, Parallel
DB-25 & Serial PS/2 Modules,
Input & Output Endcaps
AC Power Adapter

\$425

Websearch : XIR068

Office Communications Starter Kit
Parallel DB-25, Serial PS/2
& Ethernet 10 Modules
Input & Output Endcaps
AC Power Adapter

\$485

Websearch : XIR069

4-Port USB Hub Module:

Adds four USB ports for connecting multiple USB devices including printers, keyboards, mice, storage devices, digital cameras, speakers, scanners and many other USB devices.

\$125

Websearch : XIR070

Parallel DB-25 Module:

Adds one parallel (DB-25) port for connecting parallel printers.

\$95

Websearch : XIR072

Ethernet 10 Module:

Provides connection to 10Mbps Ethernet networks for access to network utilities, the Internet, E-mail and other network resources.

\$195

Websearch : XIR075

Serial DB-9 Module:

Adds two serial (DB-9) ports for connecting devices such as mice, handheld PDA cradles and external modems.

\$225

Websearch : XIR073

Modem 56 Module:

Provides high-speed 56K modem connection for access to the Internet, E-mail and other online resources.

\$285

Websearch : XIR076

Serial PS/2 Module:

Adds two serial (PS/2) ports for connecting devices such as mice, keyboards and keypads.

\$125

Websearch : XIR074

7-Port USB Hub Module:

Adds seven USB ports for connecting multiple USB devices.

\$175

Websearch : XIR071

End Caps:

Required for every PortStation system - adds input and output ports to the system. Already included in Starter Kits

\$175

Websearch : XIR077

Xircom RealPort Ethernet 10/100 + Modem 56

The RealPort Ethernet 10/100 + Modem 56 combines 10/100Mbps Ethernet, 56K modem, GSM, AMPS cellular and ISDN connectivity, in a single cable-free Integrated PC Card solution. GlobalACCESS features make it easy to connect to information from any location, anywhere in the world. The revolutionary RealPort Integrated PC Card family solves the number one problem mobile users experience with PC Cards today—lost, forgotten, or broken cable connectors and broken pop-out jacks. Patented RealPort Integrated PC Cards provide robust and reliable communications by integrating connectors directly into the card. With RealPort Integrated PC Cards there are no cables and no hassles. Connecting to information in the office or on the road has never been easier.



NOW ONLY

\$619

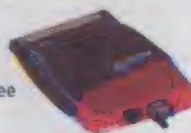
Websearch : XIR046

Xircom RealPort Modem 56

The Xircom RealPort Modem 56 offers mobile users high-speed 56K modem functionality in a robust Integrated PC Card with built-in connectors.

Features & Benefits:

- Integrated modem and telephone handset pass-thru connectors provide reliable cable-free connectivity
- LEDs for status information at a glance
- Telephone handset pass-thru allows receipt of incoming calls without disconnecting the modem cable
- Digital Shield protects modem from high-current digital phones lines
- Supports wide range of network operating systems including Windows 95/98 and Windows NT
- Wake-on-Ring reduces power consumption by detecting the ring of an incoming call and allowing receipt of information when the system is powered down



BEST VALUE

\$255

Websearch : XIR064



Get Connected to the Net!

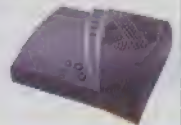


3Com U.S. Robotics 56K* External Professional Message Modem

To meet all of your data, voice and message management needs with a single product, guaranteed to provide an enhanced and productive Internet experience.

Features:

- Faster Internet access.
- Caller ID.
- One-button access to voice messages.
- Remote retrieval of voice messages through a dial-up connection.
- Built-in high quality speakerphone.
- Easier installation and use.
- V.80 (video conferencing) capable.
- Software upgradeable for future enhancements
- Backed by a Lifetime Limited Warranty.
- Valued-added Connections CD-ROM Software



JUST

\$279

Websearch : USB105

3Com U.S. Robotics 56K* Voice Fax Modem

Includes V.90 ITU 56K standard and X2 technology

Experience the Internet like never before! Grab graphics-rich web pages, e-mail, huge data files, real-time sound and video faster, play intense games, get more done online. Compatible with both the V.90 ITU 56K standard and X2™ technology. Includes a CD-ROM jam-packed with great software for work and play. Visit www.3com.com/56k for a compatible Internet provider near you or call us on 1300 300 003.

Key Benefits:

- Number 1 selling modem in the world
- Brings you great web sites faster
- Software upgradeable for future enhancements



ONLY

\$219

* Can receive up to 56Kbps. Actual speeds may vary. Requires compatible phone line & server equipment.

Websearch : USB104

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D-Link DFM-560E

56Kbps External Data Fax Voicemodem

Speed:

- Data - 56Kbps capable download speed from ISP supporting 56K Flex & V.90
- Fax - 14.4Mbps capable download speed
- Voice - Data encoding at 11025KHz or 7200KHz

Features:

- Rockwell chipset
- K56 Flex, ITU V.90 standard
- Built in DTE interfaces: Parallel 16550A UART-compatible interface and Serial ITU-T V.42 (EIA/TIA-232-E)
- Caller ID and distinction ring detect
- Fax on demand and retrieval
- Full duplex speakerphone FDSP mode
- Supports digital telephone answering machine, voice annotation and audio recording playback applications



ONLY

\$99

Websearch: DFM560E

D-Link DFM-560IS

Quality K56flex, V.90 Modem at a ridiculously low price

- ITU V.90 and K56flex Auto-Detect
- Fax modem send and receive rates up to 2880bps
- 32-bits PCI local Bus Interface
- Full duplex speakerphone (FDSP) mode
- Speaker volume control and muting
- Adaptive line and acoustic echo cancellation
- Noise suppression
- MMX processor required



**56K V90
MODEM**

STILL ONLY

\$49

Websearch: DFM560IS

NetComm Print Server

You can install your NetComm NP3620 Mini Print Server in minutes. It offers a single port that connects direct to the printer and a simplified Wizard which makes it easy to install and configure in any Windows environment. Small, convenient, stand-along print sharing.

- Easy to install and use
- Stand-alone: frees up system resources
- Compatible with most printers
- Supports extensive Windows operating system
- Pocket-sized powerhouse



Order any Banksia or NetComm Modem and receive a FREE SlimCard Calculator

\$179

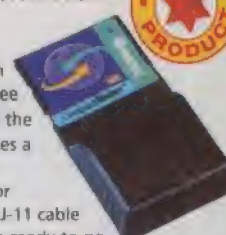
Websearch: NP3620

Verbatim Compact Modem

The world's first Compact Flash sized 56k Fax/Modem for Palm PC and PDA's

The Compact Modem from Pretec and Verbatim allows Windows CE based PDA's with a Compact Flash slot easy access to the Internet or email at an error-free high speed data transfer rate. It's a PC Card too! Add the included Compact Flash Adapter and this card becomes a Fax/Modem PC Card that can plug into any notebook computer with a PCMCIA slot. And there's no need for expensive cables or connectors - simply connect the RJ-11 cable from the modem to a standard phone line and you're ready to go.

- K56flex and ITU V.90 standard
- Supports Win 95/98/NT, and Windows CE
- Video Conferencing Ready, supports V.80 application interface for synchronous H.324
- Streaming



\$299

Websearch: VER560

Banksia EasiHub56

Connection Evolution - USB Hub & 56K Modem All-in-One!

One of the smartest and affordable communication devices money can buy - the EasiHub56 allows you to add three additional USB ports to your single USB host port and simultaneously surf the net via the built-in 56K modem. Doing away with separate hubs and modems has never been easier!

- V.90 56Kbps ITU standard
- K56flex supported
- 100% compliant with any USB devices
- True Plug and Play
- Internet-ready
- Power supply included for optimum performance



NEW

\$169

Websearch: EASIHUB

NetComm Roadster II 56

Data fax SVD and speakerphone modem

The Roadster II 56 is a great value package voice/data/fax modem to suit the online gamer, the small office user and the Internet power user. It even comes bundled with industry leading software enabling you to get started in minutes, so it's also perfect for the first time user too!

- Dual mode 56K flex V.90
- Rockwell chipset
- Ultra Connect for faster connections and downloads
- Headset included
- Free Symantec WinFax Pro



\$219

\$219

Get Connected

Websearch: NET147

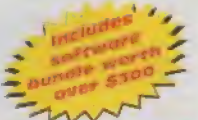
Websearch: NET028

NetComm Business Value Pack

The complete personal business package

Perfect for the SOHO or Internet power user, this bundle will have you up and running in minutes!

- The NetComm Simplicity external data/voice/fax & speakerphone modem - Dual K56Flex & V90 Technology, lets you transmit and receive faxes and data directly from your desktop
- Quicken Personal, industry leading finance software - gives you control over your finances and even lets you trade online www.quicken.com.au
- 100hrs Internet access, supplied by OzEmail (conditions apply)
- VET Antivirus - virus detection & protection software
- SmithMicro QuickLink - PC and modem communications software
- Internet Explorer



\$199

Websearch: NET029

Banksia WaveSP 56

The fully featured 56,000bps modem!

Includes:

- High speed data transmission at 56,000bps (v.90 standard)
- Microsoft Internet Explorer for Internet surfing & Web site construction
- Ultra connect for faster connections and downloads
- Simultaneous voice & data (SVD) transmission
- Full duplex speakerphone (hands free telephone)
- Fax transmission at 14,400bps
- Fully featured smart answerphone with multiple voicemail boxes
- A radical new shape for optimum audio performance
- The best new games



\$199

Websearch: BANK003



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• Next day*
• International*



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Monday to Friday
10.00am 'til 3.00 pm (EST) Saturday



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Acer Fast Ethernet Hubs

- Instant 100Mbps band width for desktop networking
- Elegant design and cost-effective fast ethernet solutions
- Full plug-and-play function without any configuration needed
- Comprehensive network utilization for easy trouble-shooting
- A complete set of LED's indicate the real time status of network Power, Collision, Link, Port Link and Rx.



8 PORT 10/100
\$329

16 PORT 10/100
\$589

Websearch: AC3001

Websearch: AC3002

Acer Fast Ethernet Switches

- Dual speed switch with 1 up-link port
- Supports auto-negotiation per port
- Data Store-and-Forward operating with packet error filtering
- 2K address table with dynamic allocation for data switching
- Comprehensive LED displays to show the real-time status monitoring
- Elegant appearance



5 PORT 10/100
\$280

8 PORT 10/100
\$495

Websearch: AC3003

Websearch: AC3004

Acer PCMCIA 10/100Mbps Network Card

Provides fast ethernet access for notebooks, handhelds and PCs with PCMCIA slots that support CardBus standards. Easy plug and play installation, and automatically negotiates 10 or 100Mbps connection rate. New from Acer.



PCMCIA CARDBUS NIC
\$159

Websearch: AC3005

Netgear 10/100 Dual Speed Hubs

The NETGEAR DS100 series of 10/100 Mbps Dual Speed Hubs connects multiple PCs to share printers, files, Internet access and e-mail communications. One can mix and match 10 and 100 Mbps PCs, servers and peripherals with these hubs, all without any configuration required. The DS100 family combines a lot of capabilities in very compact form-factors and is designed for small business users who are very price conscious. Auto-sensing dual-speed ports one can connect 10 or 100 Mbps network devices to the hub. Each port individually senses and adjusts to run at the proper speed and has full connectivity among devices. Each unit has a built-in self-learning bridge that provides the communications link between the 10 and 100 Mbps network devices. The intelligent bridge automatically manages network traffic such that 100 Mbps traffic does not unnecessarily crowd the 10 Mbps network segment and 10 Mbps traffic does not crowd the 100 Mbps segment. Easy, plug-and-play installation the DS100 series comes up and running with no software to configure. Each network port negotiates with the connected PC/network card to match the speed, making network speed upgrade effortless.

- Compact, sturdy, metal case
- Compact design fits anywhere and the DS100 series can be wall mounted.

Vista network ports with built-in LED's These LED's provide clear and intuitive status. In addition, 2 LED bar graphs provide online status of network utilisation.



8 PORT 10/100
\$420

Websearch: NET100

4 PORT 10/100
\$165

16 PORT 10/100
\$470

Websearch: NET105

Netgear FS Series 10/100 Fast Ethernet Switches

The FS100 series Fast Ethernet switches brings the 100 Mbps switching technology in a compact form factor to the small office marketplace at an aggressive price. These switches segment networks for improved performance, enabling the most demanding multimedia and imaging applications. Since each port is auto-speed-sensing, individual hubs or directly attached servers can easily be upgraded from 10 to 100 Mbps. 2, 4 or 8 switched 10/100 Mbps ports Segments network and provides dedicated 100 Mbps (megabits per second) band width to each connected desktop PC, server, or hub and joins network segments to extend overall reach. Each port can run at 10 or 100 Mbps, simplifying network migration. Auto-speed and duplex mode sensing each port can automatically negotiate the network speed and duplex mode with the remote end, taking the burden of configuration off the user. At the higher speed running in full duplex mode, each port supports up to 200 Mbps of information throughput. Vista jacks with built-in LEDs clearly indicate port status Simplifies installation and troubleshooting. The switch is plug-and-play with no software to configure.

- Versatile and compatible
- Compact and easy to install

The worldwide leader in hubs and switches ensures the highest quality, reliability and support.



8 PORT SWITCH
\$429

Websearch: NET123

5 PORT SWITCH
\$239

8 PORT SWITCH
\$359

Websearch: NET124

Netgear 10/100Mbps Starter Kit

This Network Starter Kit contains everything that Windows users need to start 100Mbps networking right away, all in one box.

- Kit Contains:
- One 4-Port 10/100Mbps ethernet hub
 - Two PCI 10/100 net work cards
 - Two 25 foot network cables
 - How-to guides



\$235

Websearch: NET155

Netgear 10Mbps Starter Kit

By taking the best in networking technology and making it simple and affordable, NETGEAR brings the benefits of networking into the hands and budget of small businesses.

- Kit Contains:
- One 4-Port 10Mbps ethernet hub
 - Two PCI 10/100 network cards
 - Two 25 foot network cables
 - How-to guides



\$135

Websearch: NET174

Netgear FA310TX 10/100Mbps Network Card

The NETGEAR FA310TX is an auto-sensing, 100BASE-TX Fast Ethernet PCI adapter designed to support the next generation multimedia power-applications.

- Key Features
- 10/100 Mbps operations
 - Auto-sensing RJ-45 interface
 - Quick "one-step" installation
 - Lifetime warranty
 - High-throughput and low CPU utilization
 - Full or half-duplex
 - Five at-a-glance LEDs

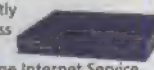


\$59

Websearch: NET109

Netgear RM356 Analogue Modem Router

Home offices now can connect up to 4 PCs (with network cards) directly connect to it to share access to the Internet using one ordinary phone line and one Internet Service Provider account. You can connect the RM356 to NETGEAR Ethernet hubs for unlimited PC connections. Includes 5 year warranty!



\$560

Websearch: NET125



4-Port USB HUB

DU-H4

The D-Link DU-H4 is a 4-port Universal Serial Bus USB hub that allows a user to connect up to four USB peripherals or devices to their USB ready PC or iMac. It provides an out of the box industry standard Bus. The DU-H4 is targeted at PC and iMac users that are expanding the number of USB ports on their system. The DU-H4 is designed to provide quick and easy access to the four type "A" downstream ports for connecting peripherals with USB support, other USB hubs and devices. A single type "B" upstream port is provided for connecting to the host computer, or another USB hub. Configured directly by the operating system, the DU-H4 operates seamlessly with both Microsoft's OpenHCI and Intel's UniversalHCI. Diagnostic LED's are mounted on the top of the device to provide the user with power state and port status. The DU-H4 is packaged with all necessary manuals, a 6-foot USB 'A' to 'B' cable, and a AC power supply to ensure that the user is able to easily and quickly install and use the device.



ONLY
\$75

Websearch: DLK024

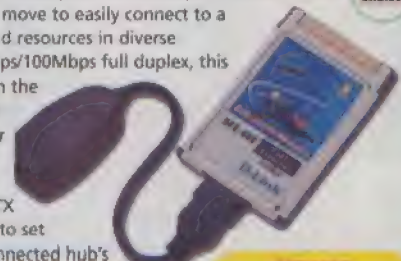


10/100Mbps CardBus PC Card

DFE-660TX

High Performance

This is a 32-bit high-performance dual-speed 10/100Mbps CardBus PC card designed to permit users on the move to easily connect to a network and share databases and resources in diverse environments. Supporting 10Mbps/100Mbps full duplex, this adapter is engineered to unleash the power of today's notebooks and turn them into robust stations or servers. The card's single connector connects to either 10BASE-T Ethernet or 100 Base-TX Fast Ethernet without any need to set configurations. It detects the connected hub's capability and auto-negotiates to use the highest available speed.



REDUCED
\$169

Websearch: DLK033



Ethernet Interface Adapter

DFE-530TX

- Intelligent Ethernet/Fast Ethernet Adapter, Auto negotiating 10Base-T/100Base-TX (Nway).
- Plug and Play support. Low CPU utilisation.
- 32 Bit high performance.
- Optional remote boot rom. Certified driver for Netware, SCO Unix, Windows 95 and Windows NT.



\$49

Websearch: DLK006



Fast Ethernet Network Kit

DFE-905

- Easy to install, 10/100Mbps Network Kit for SOHO users.
- Backed up by D-Link's lifetime warranty and lifetime support.
- Includes two Cat5 20 feet cables and AC power adapter for hub.
- Includes 1 dual-speed hub and 2 auto sensing 10/100 Mbps network cards.
- Simple plug and play installation.
- Runs Windows 95, 98 NT, Netware, others.
- FCC Class B, CE Mark, VCCI Class B, BCIQ.

\$289

Websearch: DLK017



10/100Mbps NWayDual Speed Hub

DFE-904

- IEEE 802.3 10Base-T Ethernet repeater.
- IEEE 802.3u 100Base-TX Class II Fast Ethernet repeater.
- 4 Ethernet or Fast Ethernet ports.
- MDI-II uplink port for easy expansion.
- Selection between Ethernet and Fast Ethernet via switch.
- Extensive diagnostic LEDs.
- Compact size, light weight.

\$185

Websearch: DLK020



3-Port USB Hub + 1 Serial Port + 1 Parallel Port

DU-H35P

- 3 USB A-type ports for USB device connection, 1 USB B-Type port for Upstream connection to PC or another USB hub.
- 1 Serial and 1 Parallel port for non-USB device connection. User selectable as self or bus powered. 6 foot 'A' to 'B' cable.

\$159

Websearch: DLK025



10/100 SmartSwitch

DES-1008

These switches are designed to enhance workgroups' performance while providing a high level of flexibility. Powerful yet easy to use, they allow users to simply plug any port to either a 10Mbps or 100Mbps node to multiply bandwidths, boost response time and satisfy heavy load demands.

DES-1004 also illustrated



JUST
\$599

Websearch: DLK035



2-Port Internet Ready Server

DP-602

- 1 x 10/100Mbps NWAY Ethernet Port, 2 x RS-232 460kbs Com Ports. Supports NAT for single ISP user account, Dial-on-Demand.
- Admin through Windows based program, Web browser and telnet.
- Ethernet Print Servers.
- DHCP, PPP, PAP/CHAP Security. Dual use of Com ports for double band width. Support for Analog modem or BRI ISDN TA.

GREAT VALUE
\$419

Websearch: DLK026



Dial Up Router

DI-510

This device's dial-on-demand function allows your network to establish a line connection when needed without requiring users' intervention. Band width-on-demand will dial-up additional modems or ISDNs depending on the number of users or the amount of network data to save on connection charges.



ONLY
\$399

Websearch: DLK031



1-Port Pocket Size Ethernet Print Server

DP-101

- Support Windows NT, Windows 95, UNIX, TCP/IP, IPX, NetBEUI and Appletalk protocols.
- With 10 Mbps Ethernet UTP interface. Supports 1 Parallel Printer via connection to Centronics port.
- Supports up to 36 Novell Network file servers, Easy configuration through Windows, Telnet.

\$239

Websearch: DLK023

Hardw are



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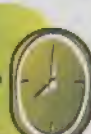
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WHY BOTHER WITH A UPS?

Have you ever been "spiked"?

You've spent a lot of hard earned money on your PC. It has all your valuable data on it, and you can't afford to be without it. But you already know that the power supply to your PC is hardly ever constant. Power surges, or "spikes" occur all the time. Lightning storms, reconnection of utility transmission lines, transformer changeovers and generator start ups are just a few of the possible causes for surges. And you know that if you are not protected, your PC and data could be permanently damaged by these surges. Which is why you bought an APC UPS - it gives you high quality surge protection, protecting the value and lifetime of your investment. When the lights go out, can your PC stay on? UPS are commonly found connected to computer equipment, and for good reason. For most businesses, the data stored on such

computer equipment is highly valuable and requires reliable protection. Customer information, transaction records, even internally generated data are all at risk of corruption or deletion due to bad power or no power. With a UPS, when the power shuts off, the battery immediately kicks in. With your computer now receiving power directly from the UPS battery, you now have enough time to save the data in the application you're running and then properly shut down the computer. You can even set it up to close your applications correctly when you are not there. There are a range of APC UPSs for every type of customer. To select the one for you, you can go to: www.iswh.com.au/apc/workstation for stand alone machines or www.iswh.com.au/apc/networks for server requirements.

Back-UPS Pro

Smart battery backup and high-performance surge suppression for Windows 95/98 and NT PCs.

Power problems wreak havoc on today's multitasking networked or stand-alone PCs. The more you do with your PC, the more you stand to lose. An APC Back-UPS Pro instantly switches your computer to emergency battery back-up power and allows you to work through brief power outages without data loss or downtime. The APC Back-UPS Pro uses PowerChute Plus power management software with WorkSafe to save

files and shut down your computer safely in the event of an extended power failure. High-performance surge suppression for AC line and network/dataline protects all paths to your system from electrical noise and damaging power surges - even lightning.

Back UPS PRO 280 Si

- Output Power - 280VA/180 watts
- Transfer - 2ms typical
- Typical backup time at half load - 23.4 minutes
- Typical recharge time 6.7 hours

\$289

Websearch: APC001

Back UPS PRO 420 Si

- Output Power - 420VA/260 watts
- Transfer - 2ms typical
- Typical backup time at half load - 13.6 minutes
- Typical recharge time 7.0 hours

\$389

Websearch: APC023

Back UPS PRO 650 PNP

- Output Power - 650VA/410 watts
- Transfer - 2ms typical
- Typical backup time at half load - 13.9 minutes
- Typical recharge time 5.5 hours

\$525

Websearch: APC003



APC Smart UPS

Performance power protection for servers and networks

Smart-UPS protects your data by supplying network-grade battery backup when power fails. With PowerChute plus software the uninterruptible power supply (UPS) will safely store data and shut down your network operating system before the battery is fully discharged, whether you're there or not. SmartSlot internal accessory slot allows you to install

optional accessories to enhance the performance of your UPS. APC Smart-UPS is the perfect UPS for file servers, minicomputers, UNIX CPU's, internet hubs, telecommunications systems and other mission-critical applications.

APC Smart UPS 420

- Power Output - 420VA/260 watts
- Transfer - 2ms typical
- Typical backup time at half load - 13.6 minutes
- Typical recharge time 7.0 hours

\$470

Websearch: APC025

APC Smart UPS 620

- Output Power - 620VA/390 watts
- Transfer - 2ms typical
- Typical backup time at half load - 15.3 minutes
- Typical recharge time 5.5 hours

\$615

Websearch: APC026



APC Powerstack

Optimized power protection for racked/stacked internet working equipment and thin servers. PowerStack models (PS250, PS450) take up only 1U of rack space to protect internet working equipment in racks where space is at a premium. Accompany with APC MasterSwitch to provide remote reboot capabilities SNMP, Web, Telnet or modem connectivity. The Powerstack comes bundles with PowerChute Plus - the award-winning software for network administrators that provides UPS

manageability and safe system shutdown for desktops, workstations, and servers protected by APC UPSs. APC's award winning PowerChute Plus software enables you to monitor and control any APC UPS that has a serial interface port (except older Back-UPS Pro models). PowerChute Plus software dramatically enhances the reliability of your computer system and its applications by automatically protecting system and data integrity during a power crisis.

APC Powerstack 450

- Output power - 450VA/280 watts
- Transfer time - 2ms typical
- Typical backup time at half load - 10.7 minutes
- Typical recharge time 5.0 hours
- Maximum height dimensions 1.75 inches, 4.4 cm
- Maximum width dimensions 17.5 inches, 44.5 cm
- Maximum depth dimensions 13.0 inches, 33.0 cm
- Rack Height 1 U
- Net weight 22.5 lbs, 10.2 kg

\$599

Websearch: APC035

APC Powerstack 250

- Output power - 250VA/165 watts
- Transfer time - 2ms typical
- Typical backup time at half load - 27.4 minutes
- Typical recharge time 5.0 hours
- Maximum height dimensions 1.75 inches, 4.4 cm
- Maximum width dimensions 17.5 inches, 44.5 cm
- Maximum depth dimensions 13.0 inches, 33.0 cm
- Rack Height 1 U
- Net weight 18.5 lbs, 8.4 kg

\$489

Websearch: APC034



Belkin - BusStation

The Belkin USB Serial Adapter Allows you to use virtually any existing serial device, including modems, digital cameras and PDA's through your USB port

4 Port USB Hubs for PC and Macintosh

Belkin USB are the easiest and fastest way to connect USB devices into your PC or Macintosh computer. Simply connect the Hub to your computer, and connect your devices to the Hub. Because it's USB, all your devices are plug-and-play - you don't even need to turn off your computer.

Features:

- Connect up to 4 USB devices to a single USB port on your computer
- Lights on front indicate power and port activity
- Fully compliant with current USB specifications

There are many variations of the Bus Stations. Please call one of our network specialists to discuss your requirements.

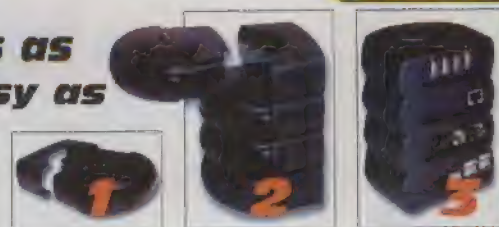
The possibilities are endless!



- Seven port hub (standard configuration)
- Two serial and eight USB ports
- Sixteen USB ports
- One serial and twelve USB ports
- One Ethernet, one serial and five USB ports
- One Ethernet, two serial and four USB ports



It's as Easy as



4 PORT USB HUB
\$119

Websearch: BEL120

ETHERNET HUB
\$129

Websearch: BEL122

SERIAL PORT HUB
\$149

Websearch: BEL121

OmniView

The Next Generation of KVM Switches

Affordable KVM switching is finally here Belkin Components has taken KVM switch technology to the next level!

Are you someone that needs control over multiple computers without the hassle and expense of multiple mice, keyboards and monitors? No need to look anywhere else because the next generation of OmniView is here. Introducing the economy Omnicube, OmniView SE and the omniview PRO series of KVM switches by Belkin Components



* Combination of OmniViews for illustration purposes only

2 PORT KVM SWITCH
\$280

Websearch: BEL108

4 PORT KVM SWITCH
\$330

Websearch: BEL109

IEEE 1284 Parallel Printer Cables

Printer Manufacturers recommend Belkins using a IEEE 1284 Printer cable with their printers, Belkins lifetime warranty ensures that your purchase will stay with you for ever - without faults - GUARANTEED!

1.5 METRE
\$35

Websearch: BEL110

3 METRE
\$40

Websearch: BEL111

6 METRE
\$60

Websearch: BEL112

VideoBus

- E-mail pictures or video clips
- Video conferences
- Connects to camcorder & VCR
- Fully compliant with current USB specifications



JUST \$159

Websearch: BEL123

USB to Parallel Printer Cable

- Connects your parallel printer to your computer's USB Port
- Print Faster
- Plug and Play
- Fully compliant with current USB specifications



ONLY \$69.95

Websearch: BEL126

USB Direct Connect

- Connect 2 PC's to create a home or small office
- Supports all standard network protocols
- Fully compliant with current USB specifications



ONLY \$149

Websearch: BEL127

USB BusPort Mobile

- Add USB capabilities to your Notebook PC or Apple PowerBook quickly and easily
- Instantly connect USB devices such as USB printers, modems, speakers, digital cameras, scanners and hundreds of other devices
- Supports 32-bit CardBus PC Card Type II Slot
- Provides 2 USB Type A ports
- Compatible with Windows 98 or Mac OS 8.6 or higher
- Easy drop-in and user friendly Plug-and-Play installation
- Fully compliant with current USB OHCI Specifications



\$149

Websearch: BEL128

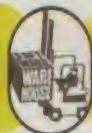
20 Piece Tool Kit

3 Way Ratchet Driver Set, 3-Prong Parts Retriever Dual Phillips Screwdriver, Chip extractor & inserter



ONLY \$29

Websearch: BEL113

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**FlyVideo 98**

LifeView's new FlyVideo 98 boasts the latest in TV viewing, video capture and Internet broadcast reception. Just add this Plug and Play compatible board into your PC and you are ready to go! Now you can capture high quality still video or full-motion video footage. Add these video images to your multimedia presentations, demos or web pages.

FlyVideo 98 comes with an intuitive interface making all capture and viewing functions a snap to do. You can make all fine tuning adjustments, volume control and viewing styles right on screen!

Features & Benefits:

- 125 channels built-in and cable ready tuner allows crisp TV or video viewing in a sizeable scalable window on your PC monitor.
- Capture & image quality up to 640 x 480 (NTSC) and 768 x 576 (PAL).
- Supports up to 1280x1024 and 24-bit desktop viewing.
- Full Motion Video Capture up to 30 fps to AVI file format.
- Still Frame Video Capture saves to BMP file or Clipboard.

* While stocks last



TV Capture For \$99!

SPECIAL OFFER
\$99*

Fly Video 98 FMR with Remote Control + FM Radio Tuner
ASS027.....**\$189**

www.iswh.com.au Websearch: ASS026

RoboCAM

Unbelievable Value

Lifeview's USB RoboCAM features the latest in USB and video capture technology. The USB RoboCAM can preview video and capture to your PC either as a still image or as a motion video clip. The USB RoboCAM is highly portable and can easily be installed on a notebook as well as a desktop PC. No additional power is required as the USB RoboCAM draws power directly from the USB port on your PC.

USB RoboCAM is designed to allow you to display videos up to full screen and capture still images up to 1024 x 768 or live motion up to 640 x 480 with high colour quality. Lifeview Utility is also included with the USB RoboCAM to harness all of the features into one easy and intuitive interface. Control all aspects of your video capture right down to colour adjustments to make sure your video images are just right.

- Sizable capture from 160 x 120 up to 640 x 480 resolution.
- Capture up to 30 frames per second.
- Formats supported include: CIF, SIF, and VCD.
- Capture to Microsoft AVI file format.
- Sizable capture up to 1024x768 resolution.
- Supports 16, 24, and 32-bit color.
- Save to BMP, JPG, or Clipboard.
- USB Cable with Full Hot Plug And Play Support. Plug into USB port regardless if computer is powered up or not.
- Hardware Snapshot Button for Point and Shoot image capture.

* While stocks last



NEW VALUE PRICE!

SPECIAL OFFER
\$99*

www.iswh.com.au Websearch: ASS023

Pocket Scan Converter (PSC 1106)**The Low Cost PC-to-TV Display Solution**

Using the Pocket Scan Converter in conjunction with your notebook computer (or PC), any presentation can be displayed on a TV or recorded onto video tape, making the Pocket Scan Converter ideal for business, education and training applications. This compact device simply plugs into your notebook/PC and the other end into a TV/Video to put your presentation onto the big screen. And when the work is done you can play computer games on your TV. Designed with flicker reduction circuitry and VHS support, the Pocket Scan Converter produces extremely vivid, high quality images with up to 16.8 million colours.



ONLY
\$185

www.iswh.com.au Websearch: PSC1106

DV MPEG 5

The production of MPEG files has never been easier and faster. The DVMPEG drivers work directly with virtually any Windows video editing and animation creation program and compress while you are rendering or saving to AVI file. Just select DVMPEG as a compression method for video and audio... and get MPEG right away! No other program in the world can accomplish these things in one single step! These incredible gains in efficiency and compression are produced with a few clicks of the mouse. In a matter of minutes you can produce small portable MPEG 1 video files which can even be easily transmitted over regular telephone lines or the Internet. Or, you can produce broadcast quality MPEG 2 files and play them back instantly to make professional quality video presentations or record computer animation to video tape.



ONLY
\$429

www.iswh.com.au Websearch: DVMPEG5

MPEGator Video Office

MPEGator VideoOffice is the first and only product on the market that enables you to capture very compact video and audio clips in MPEG1 format without using dedicated pricey hardware! Produce quality video clips that use only a fraction of the disk space used by regular compressed or uncompressed AVI movies (yes, you can make AVI clips, too!).

Use MPEGator VideoOffice to:

- Liven up your reports, databases or presentations with quality video clips.
- Create neat video contents for personal or business web sites.
- Send video e-mail to your friends and family.
- Live video conferencing across the Internet and intranets.
- High resolution still image capture for dazzling slideshow or unique desktop wallpaper.
- Create family video archive with titles and special effects on CD-ROM.



\$699

www.iswh.com.au Websearch: DVMPEG5

MPEGator

High quality MPEG encoding at a great price! MPEGator opens up a new market for video CD production, video conferencing, digital security systems, multimedia content creation and many more. MPEGator is the best choice for high quality, real time MPEG1 encoding at an affordable price. Use MPEGator for:

- Creation of high quality MPEG1 clips in real time.
- Video CD 2.0 production.
- Video On Demand contents.
- Live video streaming over networks.
- Interactive video training materials.
- Medical and scientific events monitoring.
- Multimedia contents for Web sites.
- And much more!



\$3055

www.iswh.com.au Websearch: DVMPEG5

Turn Ordinary Videos Into Extraordinary Videos with Pinnacle Studio DC10 Plus

Features:

- Pinnacle's award winning Studio editing software which offers users simple drag and drop editing, plus 100s of special effects.
- TypeDeko titling software for giving your productions professional looking titles.
- SmartSound Studio software for generating background music and for adding narration or a CD soundtrack to your movies.
- Microsoft Direct Show technology for instantly previewing your movie.
- The ability to output AVI files for the Internet.
- Microsoft Net Meeting software for video conferencing.

Internal/External	Internal
Disk Space (1/2 hr vid)	1.5GB-10GB
Max Resolution Capture	760x576
	50 fields/sec
Output	768x576
	50 fields/sec
Import AVI files	Yes

Note: Studio DC10 Plus replaces: Miro DC10, Miro DC20, and Miro DRX

RECOMMENDED PC REQUIREMENTS, PROCESSOR P233 OR Celeron 300A, HARD DRIVE 6GB, RAM 64MB SCSI DRIVE OPERATING SYSTEM, WIN95/98



\$599

Websearch: PMA24

ATI All-in-Wonder

All-in-one TV, video and editing multimedia Everything you need in one great product. The All-in-Wonder even features real-time video compression for recording TV programs without using too much space.

- 32MB
- 128 bit, 3D, 2D and 2D AGP graphics card
- DVD through PC or home theatre
- TV Tuner
- Web TV
- Video Editing
- TV Out
- DVD Hardware
- 5 Year Warranty
- Games & video editing software included

32 MB



\$549

* Box shown for illustration purposes only

Websearch: A7030

ATI Rage Fury Maxx

A whopping 64MB and dual processors deliver 3D game frame rates at extraordinary levels. This card will deliver incredible 3D performance with smooth animation, amazing colour depths, rich and realistic lightning effects and life like textures for the most graphic intensive games.

- 64MB (Dedicated 32MB per chip)
- Powered by dual ATI RAGE 128 PRO graphics engines
- Built in DVD hardware
- Twin cache
- Delivers 500 Megapixels/sec fill rate required for high rate frame game play
- 5 Year warranty
- High resolution, true colour graphics

64 MB



\$569

Websearch: A7030

ATI Xpert 2000

32MB and DVD in one solution

Gives PCs 32MB of graphics memory at the price of 16MB! Perfect graphics upgrade for Pentium II 300Hz (or compatible) systems and up.

- 32MB of powerful memory
- 128-bit RAGE 128 graphics engine
- Incredible 3D and 2D graphics
- Hardware DVD video playback
- 32-bit true color 3D graphics up to 1920x1200
- 2D graphics up to 1600x1200@85Hz
- Full DirectX, Direct3D and OpenGL acceleration
- 5 Year warranty



\$249

Websearch: A7033

Monster Sound MX400

Monster Sound MX400 rocks your PC audio world by integrating ground breaking technologies by ESS and Sensaura for scorching 3D positional audio, enhanced DirectSound3D, TRUE quadrasonic playback, and Dolby Digital surround sound, create, play, download, store and manage the hottest digital audio formats from the Internet or rip tracks from your CD collection to build your own high quality MP3 files. So Up Your Audio with Monster Sound MX400!



\$159

* Requires Dolby Digital receiver

Websearch: DIA057

Diamond Stealth 3 5540 - AGP

Diamond's Stealth III 5540 ushers in a new era in PC gaming! Stealth III is the ultimate in graphics value!

- S3 Savage4 Pro+ for leading graphics features with 128-bit 2D, 3D and video engine
- Life like 3D image quality featuring S3TCM texture compression
- 32MB of high-speed memory for high resolutions to 1920x1080
- Hardware-accelerated DVD to view full screen DVD (MPEG-2) (AGP version only) and MPEG-1 videos
- Direct3D and OpenGL support for today's hottest games and software



\$199

* Box Shown for illustration purposes only

Websearch: DIA063

Diamond Viper II

Add maximum realism to your gaming experience with Viper II! Tear through high-intensity games and demanding Windows applications with unrivalled graphics and breathtaking cinema quality video. Based on the powerful S3 Savage2000 processor, Viper II beats the competition with higher frame rates and cutting-edge 3D features.



\$359

\$512

Websearch: DIA065

Websearch: DIA069

Miro DC1000

The next generation of video is digital and MPEG-2 is the world-wide digital standard. With the MiroVIDEO DC1000, Pinnacle Systems offers a non-linear video editing system that meets the highest quality standard for MPEG-2 productions. For full product information and specifications, check out our website at www.iswh.com.au.



\$4155

Websearch: LAK04

Miro DC30+

Whether you are creating industrial videos, commercial videos, corporate presentations or training tapes, building footage for multimedia CD-ROMs, 3D animation, wedding videos, or just want to capture and edit your holiday video, nonlinear editing makes it easy for you to be creative and tell your story in the most effective way. Check out our website for full product information.



\$1135

Websearch: LAK070

Studio PCTV USB

Pinnacle Systems STUDIO PCTV USB is a full-featured, low-cost USB TV Tuner and FM Tuner & Video Capture Device with Pinnacle's award-winning STUDIO video editing software. No need to turn off your PC to install this device. With all the features of the PCTV Pro, the USB version also lets you output your TV signal directly into an existing video capture device like the Studio DC10 Plus and capture full screen TV.



\$229

Websearch: LAK129

\$335

Websearch: LAK127

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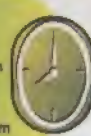
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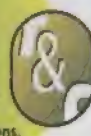
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terms and conditions.

**Microsoft SideWinder Dual Strike****Experience 3-Dimensional Action!**

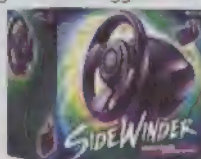
The Microsoft SideWinder Dual Strike's rotating right hand perspective control enhances precision mouse movements like looking, aiming and firing. The left hand controls agility movements compliment running, dodging and sidestepping. SideWinder Dual Strike allows for easy and natural control of character movements - aiming, shooting, running, jumping - to enhance play in first-person shooter and action/adventure games. SideWinder Dual Strike also frees gamers from their desktops allowing for comfortable, extended game play sessions.

JUST
\$79

Warranty: 3 Years

Microsoft SideWinder Precision Racing Wheel**Precision for the fast lane!**

The SideWinder Precision Racing Wheel is a complete driving system including a compact, yet rugged state-of-the-art PC steering wheel that includes an easy-to-release clamp for quick attaching and removing, sturdy non-slip pedals, and 8 buttons, including 2 shifters/triggers. You can program and customize with SideWinder Game Controller software. Precision driving experience - designed with potentiometers, the SideWinder Wheel offers precision handling for the performance that racing fanatics demand. Professional styling for the wheel and pedals means quality, comfort and control. SideWinder Game Controller software enables you to fine-tune the set up of your wheel for your own driving preferences, improving your chances of victory. With eight programmable buttons, you can control the competition!

NOW
\$109

Warranty: 3 Years

Microsoft SideWinder Precision Pro

Program your best moves to the eight joystick buttons, eight-way hat switch, trigger, throttle wheel, handle rotation and axis movements using SideWinder Game Device Software. Double the functionality of your buttons, hat switch, throttle wheel, trigger, and handle movements (in supported games). Optimize Precision Pro for your gaming style by programming keystrokes, keystrings, and chords to single joystick buttons. Save winning profiles to use again and share with friends. You can even use 30 established game profiles from the experts at Microsoft.

ONLY
\$89

Warranty: 3 Years

Microsoft SideWinder Freestyle Pro

SideWinder Freestyle Pro is a revolutionary PC game controller that allows the gamer to control movement within a game by merely tilting the controller left, right, up and down. The SideWinder Freestyle Pro delivers intuitive motion sensing technology that responds to your hand and body movement. In addition, the device features both analog and digital control, which enables the controller to be effective with multiple game genres. It can be used in analog (joystick) mode when the motions sensors are turned on for precision and control and the freedom of free motion. Or use in digital gamepad mode for speed and accuracy. For the ultimate in control, you can operate both modes at once! Easy to use yet highly responsive. Move your hands and your on screen vehicle / character moves with your motion. There's nothing else like it!

REDUCED
\$85

Warranty: 3 Years

Diamond Rio PMP300**Internet Music in the Palm of Your Hand!**

Diamond's Rio PMP300 is the first portable MP3 music player that stores up to 60 minutes of digital-quality sound. It's smaller than an audio cassette and has no moving parts, so it never skips. Powered by a single AA battery, Rio provides up to 12 hours of continuous music playback. Goodnoise, the premier source on the net for high-quality, downloadable music, is located at www.goodnoise.com.

Key Features:

- Palm size for easy portability
- Supports MP3 compression
- 32MB built-in flash memory
- Expandable playback time with removable flash cards
- Skip free - no moving parts
- MusicMatch Jukebox Limited Edition software for converting CD's to an MP3 format
- CD Music Sampler

**\$305**

Warranty: 1 Year

Diamond Rio 500**The Rio 500 puts the power of digital audio in the palm of your hand!**

Rio 500 is a portable digital audio player that stores up to 2 hrs of digital-quality music and up to 32 hrs of spoken audio programs. Access thousands of music and audio files at RioPort.com and over 16,000 hours of Audible.com audio programs. Instantly create, customize and mix your favourite music and audio selections.



- 64MB onboard memory, expandable to 96MB with removable flash cards (supports future memory expansions)
- USB support for fast downloads with Windows or Mac
- Skip-free design - no moving parts
- Full version Rio Audio Manager 2.0 for encoding, managing, and playing digital audio files (free RioPort registration required)
- Three new cool colours: metallic gray, translucent teal and purple

GREEN

\$499

PURPLE

\$499

GREY

\$499

Warranty: 1 Year

Warranty: 1 Year

Warranty: 1 Year

Funkify your PC!

Add some colour to your life with these new upgrade kits from TDS. Available in Blazing Blue, Gorgeous Green, Outstanding Orange and Pretty in Pink, these kits add life and zest to the mundane PC. Each kit includes a 109 key keyboard, a two button mouse and a pair of 160 watt (pmpo) speakers. All in the funky colour of your choice! This kit comes with serial connectors.

Blue Kit	FUNKY1	\$99
Orange Kit	FUNKY2	\$99
Green Kit	FUNKY3	\$99
Pink Kit	FUNKY4	\$99



3D Blaster GeForce Pro

The 3D Blaster GeForce Pro is an incredible game accelerator, featuring the world's first Graphics Processing Unit (GPU). With the 3D Blaster GeForce, the entire 3D pipeline is handled on the card, freeing the CPU - and the developer - to create richer, more detailed worlds, with improved physics and better AI 3D Gaming will never be the same again.



ONLY
\$529

Websearch: CRE021

Cambridge Soundworks - PC Works

- Subwoofer/Satellite Design: this design lets us make the PCWorks woofer very small but sound very "big" by taking advantage of the room's natural acoustics.
- Electronic contouring: Cambridge Soundworks can "contour" or "tailor" the frequency response of the amplifiers to optimize the sound of the speakers.
- Bi-Amplification: PCWorks doesn't produce annoying distortion by using separate amplifiers for bass signals and mid/high frequency signals.



JUST
\$189

Websearch: CRE022

Sound Blaster Live! Optical

Sound Blaster Live! Optical brings you the ultimate audio experience, whether you're downloading Internet audio, playing PC games, creating your own music, or enjoying other kinds of entertainment on your PC. Sound Blaster Live! Optical provides the combination of digital-quality audio, a full-featured software bundle, and connectivity to external devices from the front of your PC instead of the back!



JUST
\$459

Websearch: CRE023

Sound Blaster Live! Player

Powered by the industry-leading reprogrammable EMU10K1 audio processor, Sound Blaster Live! Player brings you the best of digital entertainment. You'll be able to enjoy movies with Dolby Digital audio on the PC, online chatting with Creative VoiceChat and MP3 music playback accompanied by LAVA!'s interactive 3D visual animation. With Sound Blaster Live! Player, experience the full capabilities of the Environmental Audio in providing real-life multi-dimensional sound in music, games, movies, Internet-related and other applications with realistic positional audio. Sound Blaster Live! Player is easy to use with Live! Task, which lets you choose the task you want to perform and even guides you through it. Also, future Live! Ware updates will bring continual updates to your Sound Blaster Live! Player to enhance your PC experience. Sound Blaster Live! Player is truly the ultimate digital audio solution that you'll need in order to experience digital entertainment to its fullest potential!



\$169

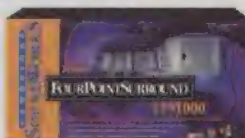
Websearch: CRE020

PCWorks FourPoint Surround FPS 1000

Surround sound speakers for DirectSound 3D Gaming!

Experience the new standard for multi-channel audio with a four-speaker surround system. Including four compact amplified satellite speakers, separate subwoofer, two rear stands and the single master volume control and PCWorks FourPointSurround, the FPS1000 is the first complete four-channel speaker system for the PC. Designed with the same technology as the award-winning PCWorks, the PCWorks Four Point Surround FPS1000 sound system delivers superb upper band response, with crystal-clear highs and great midrange for total home stereo quality. Now you can experience truly immersive 3D audio with four independent speakers. Create stunningly realistic four-channel positional audio:

- Four compact 2.75" cube satellite speakers with two surround speaker stands based on the critically acclaimed PCWorks design.
- Powered subwoofer with bass level control and contoured amplification.
- Remote in-line master volume control for all four speakers and subwoofer.
- 9-foot cables for each front satellite and 12-foot cables for each rear satellite allow wide speaker placement for superior sound separation and dispersion.
- Support for Microsoft DirectSound, DirectSound 3D and derivatives.



LOW COST!
\$169

Websearch: CRE054

3D Blaster Riva TNT2 Ultra

Pure Performance for Ultra-Fast Gameplay

Raw power. Pure performance. Nothing else even comes close to the new 3D Blaster RIVA TNT2 Ultra. From the faster clock speed and re-engineered 3D rendering pipelines of the new NVIDIA RIVA TNT2 Ultra processor to the expertly engineered PCB and cooling fan, the newest 3D Blaster is built for speed. But the 3D Blaster RIVA TNT2 Ultra isn't just about phenomenal acceleration. It also sports one of the most complete 3D rendering engines found on any PC-based accelerator. Now add 32MB of ultra high-performance memory and a 300MHz DAC to run 2D and 3D resolutions up to 1920x1200 in true colour with rock solid, super stable refresh rates. When you demand the very best in performance, image quality and reliability, you want the 3D Blaster RIVA TNT2 Ultra. It's the purest performance you can find.



\$399

Websearch: CRE024

Creative NOMAD 64MB

Creative NOMAD allows you to customize your own content and take it along with you for travel or workout. Mix your favourite selections by recording from your personal CD collection or downloading MP3 files from the Internet - and transfer them directly to your player. You can even add Environmental Audio effects to your recordings with a Sound Blaster Live! or Live! Value card. Creative NOMAD is also a digital voice recorder. You can use it as a dictaphone to take notes, record a message to a friend or colleague, and upload it directly to your PC. The Creative NOMAD 64MB Version comes with a fully functional digital FM tuner for live music, news or sports from your favourite radio channels. The Creative NOMAD 64MB Model provides up to one hour of near CD-quality audio (or more with adjustable bit-rate encoding) and 2 hours of voice-recording. Removable flash card support enables you to upgrade your player in one-step, so you can take your favourite content with you without carrying around multiple CDs or MiniDiscs. Digital storage also means your NOMAD will function as a complete digital storage device; store data files to take between home, work, or school!



\$525

Websearch: CRE068

DeskTop Theatre 5.1 2500 Digital

The Most Affordable, Complete Dolby Digital Speaker Solution for the PC! Rivaling expensive Dolby Digital home theatre sound systems, DeskTop Theatre 5.1 lets movie lovers enjoy multi-channel Dolby Digital or Dolby Surround movie sound with a PC-DVD or any consumer DVD player. Power gamers can immerse themselves in thrilling multi-channel games. And if you add on a Sound Blaster Live!, Sound Blaster Live! Value or Sound Blaster PCI128 sound card, you will enjoy Environmental Audio, a breathtakingly real experience on any audio content of the past, the present and the future! With a built in Dolby Digital decoder, two front satellite speakers, centre channel speaker, two rear satellite speakers, separate subwoofer, and rear speaker stands, this audio innovation plays back Dolby Digital from PC-DVD and DVD set-top players. For stereo signals, DeskTop Theatre 5.1 utilises Creative Multi Speaker Surround to simulate Dolby Digital sound quality from a stereo signal. The stunning DeskTop Theatre 5.1 sound system will let you hear all the great multi channel sound locked inside your DVD-player.



\$699

Websearch: CRE067



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see Terms & Conditions



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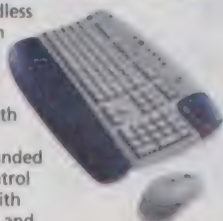
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Cordless iTouch Desktop

Cordless keyboard and cordless wheel mouse free you from cords that catch and tangle. Gain new flexibility to arrange your desk without needing a clear path or pointing at the computer. Comfortable rounded mouse provides precise control for left and right hands. With convenient iTouch Internet and multimedia control, access the Internet; visit Web pages; buy online; open e-mail; search; play CD's, DVD's, MP3 and Windows media files, adjust volume, and more with one touch of a key. Includes the AA batteries that power the keyboard and mouse for an average of six months to a year. 5-year warranty.

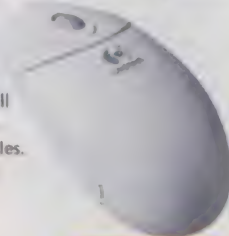


ONLY
\$175

Websearch: LOG103

Cordless Wheel Mouse

Our most state-of-the-art pointing device, the cable-free Cordless Wheel Mouse works from up to six feet away. While other cordless devices are rendered inoperable by cluttered desks, this mouse uses radio technology so you can freely operate the scroll wheel or customizable buttons despite obstacles. Comes with a five-year guarantee.



ONLY
\$89

Websearch: LOG100

Quickcam Express

Quickcam Express - The simple way to get closer! Meet face-to-face online by making live video calls. Snap and send photos as easily as you send text. You can even shoot and send video mail. No camera is necessary at the other end - which means viewing is just another click away!



Talk Face To Face On Line

\$99

Websearch: LOG101

Soundman X1

Experience the full richness of your favourite CD, MP3 and Internet music. Proprietary LIMAD technology delivers soaring high notes and solid bass. Sleek subwoofer and speakers fit easily on desktops, bookcases or entertainment centres. Automatic on/off. Add realistic, high definition sound to your PC, portable CD player or TV. 3-year guarantee.



Wake Up The Neighbours

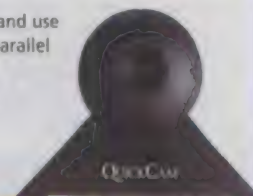
JUST
\$135

Websearch: LOG095

Logitech QuickCam VC USB

The most popular camera for personal computers makes it simple to add color images and video to e-mail, video conferences, Web sites, and more. 1-year limited warranty.

- The most popular camera for personal computers
- Color images and video for e-mail, the Web, & more
- Easy to install and use
- Available for parallel and USB ports
- 1-year limited warranty



JUST
\$175

Websearch: LOG090

Special Promotion!!! Free Games

Valid from April 1- July 1st 2000

Buy any of three Wingman products shown below and receive a free games. Choose from the following titles

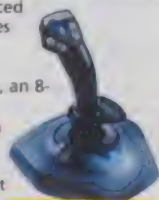
- F15 Flight Simulator
- Need for Speed III
- Moto Racer II
- Conditions apply, free game coupons supplied with order.



Logitech

WingMan Extreme Digital 3D

This twist handle joystick features a leading edge design for enhanced performance. It provides versatile hand-grip positions, seven programmable buttons, an 8-way hat switch, high-precision throttle and a unique twist handle lock feature. Users can select USB or game port connection. The stable base includes steel weight plates.



ONLY
\$78

Websearch: LOG097

WingMan Gamepad Extreme

Feel free to win with the ultimate motion-sensing gamepad. WingMan Gamepad Extreme delivers ultra-precise proportional control with engaging G-Force TiltTM technology. 10 programmable buttons become 18 with software shift functionality. Great for gamepad, joystick and wheel games. USB and game port compatible. Includes Star Wars, Rogue Squadron 3-D Elite Missions.



\$85

Websearch: LOG099

WingMan Force Joystick

For IBM compatibles
Gain realism with the world's only immediate force feedback precision joystick.

- Exclusive I-FORCE technology creates a killer force feedback experience
- High torque motors drive the stick with no gears, slop, or jerkiness
- Combat equipped with 8-way hat switch, 9 buttons and more
- 1-year warranty
- 100% Microsoft Direct X compatible
- USB and Serial connections



\$175

Websearch: LOG090

THE WORLD'S BEST PORTABLE HANDS-FREE DEVICES

CELlected

Hear your mobile phone conversation through your car radio. Plug-in-simplicity. No installation. All you do is plug one end of the CELlected and the other end into the cigarette lighter of your car. Next select any available station on your radio. Match it with the same frequency on the LED display of your CELlected and get ready to enjoy amazing sound quality of your telephone conversation.

- **Innovated:** CELlected is a true breakthrough in hands free technology
- **Mobile:** Just plug this into any car and away you go
- **Great sound:** Delivering high quality sound via your car audio systems
- **Flexibility:** CELlected's innovative software enables sound amplification on any radio frequency you select
- **Hi performance:** CELlected is equipped with a high power, ultra safe microphone that outperforms conventional plug-ins (CLA) hands free kits. It requires no special positioning.
- **Convenience:** CELlected provides drivers with a safe, convenient top quality, hands free solution. Enables volume and tone control. It cuts out echo, buzzing, fuzzing sounds and crackling.



\$149

Websearch: CAR012

Wirefree's Plug-In Hands Free Kit

Wirefree's plug-in hands free kits provides you with a flexible, convenient, low cost alternative to a fixed in-car kit. The unit provides excellent clear sound even at high speed and allows you to mobile your phone from car to car, simply and conveniently. The units plugs into your car cigarette lighter and has the following features:

- **Rotation Unit:** the unit can rotate up to 180 degrees, allowing you to place the speaker in any position you want
- **Remote Microphone:** the microphone can be mounted in a convenient position to optimise voice pick-up
- **Intelligent Battery Charging:** after the battery is fully charged, the current stops to prevent over heating. When the battery is 90% full, the battery changes to trickle charge to prevent over charging.
- **Clear Sound:** you can hear the otherside's voice clearly while high speed driving.
- **Volume control with confidential function:** on the hands free mode you can push the confidential button, the colour turns to green and you can hear & talk through your cellular phone



\$89

Websearch: CAR013

\$89

Websearch: CAR014

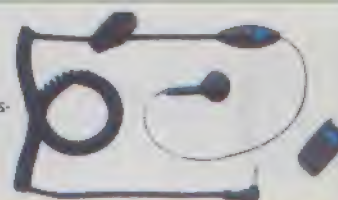
\$89

Websearch: CAR015

Cell-man Earphone Studio

With the growing awareness of safety concerns in the use of cellular phones, as well as regulations worldwide on their use in automobiles, Cell-man outperforms conventional portable earphones. With Cell-man you get more from your portable hands-free unit:

- Superior performance microphone and earphone for excellent sound quality and reception
- Snap in audio connector for maximum durability
- Attractive design with a convenient spiral cord
- On off button (in some models)
- Full duplex function.



\$17.95

Websearch: CAR016

\$17.95

Websearch: CAR017



Sound Quality with Style

Plantronics, the world leader in communications headsets, introduces an exciting new line of PC headsets. The Plantronics PC headset product line delivers the ultimate in technical performance, comfort, durability, and style. Plantronics' full line of PC headsets is designed for use with all PC applications from speech recognition and video conferencing to game playing and Internet communication.

Perfect Solution

Plantronics PC headsets are used for a variety of PC applications in the office and home environment. A Plantronics PC headset adds clarity and accuracy to any speech recognition application. Internet telephones, PC games with voice command and control, video conferencing, and music CDs are just a few of the many uses for Plantronics PC headsets. Plantronics headsets are designed for easy "plug and play" performance with today's leading soundcards. Each headset features two 3.5mm plugs for the microphone and headset (or "speaker out") jacks.

- Gaming/Multimedia Stereo Headset
- High-fidelity stereo speakers
- In-line controls for volume and microphone
- Lightweight, rugged design
- Comfortable earmuffs
- Elastomer-mounted boom for quick microphone adjustment



Mono (One ear piece)

\$59

Websearch: PLA050

Volume Control

\$99

Websearch: PLA049

Hi - Fi Extra bass

\$149.95

Websearch: PLA051

Light Weight Stereo Headset (LS1)

HardWare



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• International*



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Kodak DC/215 Digital Standard Camera with Zoom

Offers outstanding value for creative picture takers including optical zoom which provides amazing detail and vibrant colour. There's a 1.8" colour LCD that lets you review and preview your pictures. It's a snap to use, thanks to an award-winning interface and controls. For those desiring faster download speed and a greater storage capacity, these coloured cameras offer a USB Card Reader and a larger capacity picture card.



\$435

Websearch: KDC215

Kodak DC/240 Camera

In today's demanding world of business the KODAK DC240 Zoom Digital Camera provides a high quality image-building tool. It gives you the power to improve work-flow and access images quickly. The DC240 comes with all the user-friendly features you demand, making it an unquestionably smart business choice.



\$949

Websearch: KDC240

Sony FD88 Mavica Digital Camera

This model offers features designed to appeal to a wide range of users, from the typical "point-and-shoot" holiday-maker to the graphic artist needing high-resolution images with 1.3 megapixel resolution. It provides a removable 3.5" 2HD floppy disk storage media, up to 60 second MPEG movie mode, up to 10 second voice memo mode and an email photo mode.



\$1980

Websearch: SONY88

Sony Cyber-shot Camera OSCF505

Providing the user value for money with up to 38 shots, a movie mode, voice memo mode, email mode, a built in pop up intelligent flash, self timer (10 seconds), 6 picture index on LCD, and a date and time stamp. The Sony Cyber-shot Camera OSCF505 comes with a 4MB memory stick, audio / video cable, serial cable, Sony PictureGear software, USB Cable, and USB Driver Software.



\$2130

Websearch: SONY59

Panasonic Multimedia LCD Projectors

PT-L556EA SVGA 600 ANSI LCD Projector

- Features:**
- Brightness: 600 ANSI Lumens and Centre to corner uniformity of 85%
 - PCMCIA Memory Card
 - Compact Size and Lightweight - only 5.8kg - square design and retractable lens so the PT-L556EA goes straight into your briefcase easily
 - True SVGA resolution (800 x 600 pixels) and Intelligent Compression delivers XGA resolution of 1024 x 768 pixels
 - Backlit wireless remote control - with mouse and built in tools to highlight, circle, draw and point.
 - Auto Setup Picture Adjustment - automatically adjusts the vertical and horizontal position, horizontal size and phase



\$7495

Websearch: PAM56

PT-L557E Ultra Portable SVGA Projector

- Features:**
- Brightness: 1500 ANSI Lumens and Centre to corner uniformity of 85%
 - PCMCIA Memory Card
 - Compact Size and Lightweight - only 6.2kg - square design and retractable lens so the PT-L557EA goes straight into your briefcase easily
 - True SVGA resolution (800 x 600 pixels) and Intelligent Compression delivers XGA resolution of 1024 x 768 pixels
 - Backlit wireless remote control - with built in laser pointer
 - Auto Setup Picture Adjustment - automatically adjusts the vertical and horizontal position, horizontal size and phase



\$12995

Websearch: PAM57

Huge Savings On Competitors Prices

Panasonic PanaFlat LC50S

15" TFT LCD display monitor with multimedia

- Wide display area comparable to conventional CRT monitors
- Plug in compatible with CRT monitors
- High 1024 x 768 resolution at 75Hz
- Multimedia bass reflex speakers and built in microphone
- A-Agras coat for sharper images
- Advanced On Screen Display (OSD)
- Automatic pixel converter for full screen display at all resolutions
- High resolution pixel pitch of 0.2975mm
- Automatic frequency selection
- USB port connectors
- Win 95/98 Plug & Play
- 3 Year RTB warranty



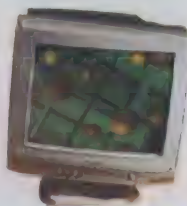
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RRP \$2650
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Websearch: PAN605

Daewoo 518B 15"

- 518B FST Colour digital monitor
- 1280 x 1024 resolution (at 60Hz)
- 0.28mm dot pitch
- Non glare anti-static screen
- 20 mode memory
- 3 year warranty



ONLY

\$299

Websearch: 518B

* Actual Products may vary from illustrations shown

Daewoo 1710B 17"

- 1710B FST Colour digital monitor
- 1280 x 1024 resolution (at 60Hz)
- 0.28mm dot pitch
- Non glare anti-static screen
- 20 mode memory
- 3 year warranty



BEST SELLER

\$519

Websearch: 1710B

* Actual Products may vary from illustrations shown

Acer 15"

- 54el 15-inch colour monitor
- Flat square, non glare screen
- Maximum resolution of 1024 x 768 at 85Hz
- Digital Control
- Energy Star, MPRII, and VESA DPMS compliant
- DDC 1/2B for Plug & Play convenience



JUST

\$359

Websearch: AC2004

Acer 17"

- 77c 17-inch colour monitor
- Maximum resolution of 1024 x 768 at 89Hz
- DDC 1/2B for Plug & Play convenience
- One-touch "ikey" auto calibration
- Full adjustment controls.



REDUCED

\$549

Websearch: AC2005

Diamond View 1570i

15" Colour Monitor

Key Features:

- Dynamic focus for improved image clarity
- Plug & Play (DDC-1 & DDC-2B (compliant)
- VESA DPMS Power Management
- Compliant with the MPR-II Low Radiation Standard
- Compliant with Australian EMC and Safety Standards
- Optional TCO Low Radiation compliance
- Extensive image adjustments using on-screen display
- 5 user selectable and adjustable colour temperatures
- 3 year limited on-site warranty



\$360

Websearch: MIT017

MIT018 Mitsubishi

Diamond View 1772e 17"

Monitor**\$645**

Diamond View 1995

19" Colour Monitor

Key Features:

- Flicker free high-resolution images - 1280 x 1024
- pixel resolution with 85 Hz refresh rate or 1600 x 1200 pixels at 75 Hz refresh rate
- Extensive range of image adjustments provided by the On-Screen Display
- Windows 95 and Windows 98 Plug & Play compatible
- VESA DPMS Power Management. Energy Star compliant
- Compliant with the MPR-II Low Radiation Standard (with optional TCO'95)
- Fully Compliant with Australian EMC and Electrical Safety Standards
- 5 user selectable and adjustable colour temperatures
- 3 year, on-site limited warranty



\$1195

Websearch: MIT019

MIT020 Mitsubishi
Diamond View 1772e 21"
Monitor**\$2095**

Sony Triniton Range

- Sleek design
- Lightweight
- Vertical scan range is 48 - 120 hz
- Bright picture and sharp image
- Wide viewing angle
- Advanced, on screen digital controls
- Low power consumption
- Designed for Win NT & Win 98



15"
\$495

Websearch: SONY62

21"
\$2515

Websearch: SONY73

19"
\$1615

Websearch: SONY74

17"
\$795

Websearch: SONY75

Panasonic SL95 19"

The Panasonic SL95 19" Monitor incorporates the ZenTan or depth reduced monitor which reduces cabinet depth. The 19 inch screen now fits smartly into a 15 inch body. With the latest techniques in coating, the A-AGRAS coat provides superior quality image display.

- Allows a 19" screen in a 15" cabinet
- AGRAS coating for high resolution images
- On Screen Display (OSD) with 5 languages
- Ideal for Desktop Publishing
- CAD design Windows 95/98 Plug & Play



\$1149

Websearch: PAN95



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We cut prices not corners.
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Fast Delivery
Full range of delivery options:
• Same day, Sydney*
• Next day*
• International*



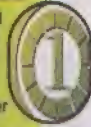
Massive Range
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Which Windows is Best For You?



From
\$219
www.Websearch.com.au MIC342

The Brand New Windows 2000 !

Windows 2000 Professional is the best desktop and mobile operating system for businesses of all sizes. It's the easiest, most reliable Windows yet because it combines the reliability, security, and manageability of Windows NT Workstation with the best business features of Windows 98. Windows 2000 Professional streamlines the familiar Windows interface by reducing desktop clutter and simplifying the Start menu. In addition to removing unnecessary desktop items, Windows 2000 Professional introduces Personalized Menus, a new "smart" feature that adapts the Start menu to the way you work by showing you the applications you typically use most often. The "intelligence" continually monitors your usage of programs that you access from the Start menu, making it easy for you to keep your Start menu clean.



Windows 2000 Professional also introduces new interface features that make it simpler to use:

- An integrated, easier-to-use search feature that helps you find information on your computer, your network or on the Web.
- More informative help when you need it. For example, the Help viewer displays an integrated table of contents and index, including the search results at the same time you are viewing a Help topic. It also includes a Favourites tab for bookmarking topics, letting you display topics that you refer to often.
- Intuitive dialog boxes and error messages that clarify your options when you need to make a decision or correct a problem.
- Built-in support for viewing and editing more than 60 language character sets, which means you can run programs in different languages on a single version of Windows.

Quick Guide To Get You The Windows Package That Is Right For You

Which one is for you ?

Before purchasing any of the new Window 2000 products we strongly recommend that you do some research as to which product will best suit your individual needs. As a brief guideline we would suggest the following product for the following users.

Who Are You?	Type Of Use?	Our Recommendation
<ul style="list-style-type: none"> • Personal User • Home User 	<ul style="list-style-type: none"> • Dual Internet access games platform • Connect Home PC's • Stunning Graphics • USB Digital Audio Support 	<ul style="list-style-type: none"> • Windows 98 Second Edition  <p>Only \$149 www.Websearch.com.au MIC21</p>
<ul style="list-style-type: none"> • Professional User • Business User 	<ul style="list-style-type: none"> • Networking Internet • Cost Of Ownership • Efficiency Of Knowledge Workers 	<ul style="list-style-type: none"> • Windows 2000  <p>From \$219 www.Websearch.com.au MIC342</p>
<ul style="list-style-type: none"> • The Windows 2000 Range 	<ul style="list-style-type: none"> • Windows Pro 2000 (Version Upgrade From NT 4.0)..... • Windows Pro 2000 (Product Upgrade From Win 98/95)... • Windows Pro 2000 (Full Product)..... 	<p>Only \$219 www.Websearch.com.au MIC342</p> <p>Only \$325 www.Websearch.com.au MIC343</p> <p>Only \$465 www.Websearch.com.au MIC344</p>

Microsoft Office 2000 Family



Microsoft Office 2000 Standard

Includes Microsoft Word 2000, Microsoft Excel 2000, Microsoft Powerpoint 2000 and Microsoft Outlook 2000.

Upgrade
\$389
NEW Websearch: MSS220



Microsoft Office 2000 Professional

Includes Microsoft Word 2000, Microsoft Excel 2000, Microsoft Powerpoint 2000, Microsoft Outlook 2000, Microsoft Publisher 2000, Microsoft Access 2000 and Microsoft Small Business Tools.

Upgrade
\$495
NEW Websearch: MSS229



Microsoft Office 2000 Premium

Includes Microsoft Word 2000, Microsoft Excel 2000, Microsoft Powerpoint 2000, Microsoft Outlook 2000, Microsoft Publisher 2000, Microsoft Access 2000, Microsoft Small Business Tools plus Microsoft Frontpage 2000 and Microsoft PhotoDraw 2000.

Upgrade
\$595
NEW Websearch: MSS221



Microsoft Office 2000 Developer

Includes Microsoft Word 2000, Microsoft Excel 2000, Microsoft Powerpoint 2000, Microsoft Outlook 2000, Microsoft Publisher 2000, Microsoft Access 2000, Microsoft Small Business Tools plus Microsoft Frontpage 2000 and Microsoft PhotoDraw 2000. Also includes Microsoft Developer Tools.

Upgrade
\$865
NEW Websearch: MSS222



Microsoft Office 2000 Small Business

Includes Microsoft Word 2000, Microsoft Excel 2000, Microsoft Outlook 2000, Microsoft Publisher 2000 and Microsoft Small Business Tools.

Upgrade
\$389
NEW Websearch: MSS223

* Boxes shown are for full version products

Office 2000 Step by Step 8 in 1

NEW!

Learn to use Microsoft Office 2000 the easiest and fastest way!

Microsoft Office 2000 Step By Step 8 in 1 is the easiest and fastest way to learn the core functionality of Microsoft Office 2000. Work through every lesson to complete the full course, or do individual lessons to learn just the skills you need. Either way, you learn at your optimum pace from the teacher who knows you best - you. Includes eight tutorials!



MS Office 2000
Step By Step 8 in 1
\$55

NEW Websearch: MSP035

Microsoft Project 2000

Microsoft Project 2000 provides you with the flexibility needed to collaboratively plan and track projects and deliver the results your business demands. It is the single planning tool for everyone in an organization. Microsoft Project 2000 has new features to increase Team, Planner, and Organizational productivity and represents a new milestone for Microsoft's project management offerings.

Includes 1 Project Central client license



NEW!

FULL PRODUCT
\$709

UPGRADE
\$279

NEW Websearch: MSS286

NEW Websearch: MSS287

Microsoft FrontPage 2000

The Microsoft FrontPage 2000 allows users to easily create great-looking Web sites exactly the way they want. They can give their Web site a professional and consistent look across all pages, import and edit HTML just as they like, and use the latest in Web technology. FrontPage 2000 allows users to easily update sites and quickly and flexibly manage Internet or intranet Web sites. Users can set up and maintain their site, easily monitor the condition of their Web site, and make updates. Workgroups or teams can work together on sites, and companies can install and administer FrontPage 2000 across their company. FrontPage 2000 allows users to work together with Microsoft Office to save time. FrontPage 2000 was designed to function more like Microsoft Office so that users can get up and running with FrontPage more quickly than ever.



FULL PRODUCT
\$169

UPGRADE
\$85

NEW Websearch: MSS236

NEW Websearch: MSS245

Microsoft Publisher 2000

Publisher 2000 is a business desktop publishing program that enables users to easily create professional-looking marketing materials. The release of Publisher 2000 offers more design options with over 2,000 professionally designed publication templates and hundreds of design elements for users to mix and match within their publications. A flexible wizard model allows users to work the way they want, and automated design expertise helps them achieve professional results without design expertise. Stronger Office integration and a complete print-to-Web publishing solution enable users to deliver professional looking results. Publisher 2000 is an integral part of the Office family of applications that look and work alike, enabling users to get up and running quickly, and to achieve great-looking results with less effort.



ONLY
\$145

NEW Websearch: MSS247

Microsoft PhotoDraw 2000

Microsoft PhotoDraw uniquely provides photo editing and illustration in one easy-to-use program to help Microsoft Office and small business users create custom looking graphics to use in PowerPoint, Word, Publisher and the Web. Especially designed for business users PhotoDraw reduces the number of steps required to complete any graphics task. PhotoDraw includes professionally designed templates, pre-set defaults and automatic correction features. Users create customized graphics with ease - with no graphics training, or reference to thick manuals. With PhotoDraw, users can assemble, manipulate and customize any of the following graphics elements: clip art, shapes, photos, including scanned photos and those downloaded from a digital camera, text, images from other graphics programs and user-drawn illustrations.



UPGRADE
\$119

NEW Websearch: MSS248



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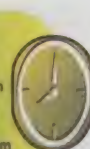
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10.00am 'til 3.00 pm (EST) Saturday



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Microsoft Windows 98

Enhance your productivity and redefine your PC's possibilities using the Microsoft Windows 98 operating system. It provides full internet integration, optimal performance and support for the latest entertainment and accessory options.



UPGRADE
\$149

FULL PRODUCT
\$289

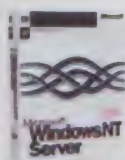
Websearch: MSCT11

Websearch: MSCT12

Microsoft Windows NT Server 4.0

Key Features:

- Lower operating costs
- Leverage your existing systems
- Globally manage users and security from a central location
- Reduce communication costs by using a VPN to dial in via the Internet
- Create professional-quality Web sites easily
- Build and deploy powerful intranet applications quickly
- Manage all Web sites across an entire network from a single location



(+5 Client)
\$1245

(+5 Client) Upgrade
\$499

Websearch: MTC461

Websearch: MTC461

Microsoft BackOffice Server

Microsoft BackOffice Server 4.5, the integrated server suite optimized for Windows NT Server 4.0, simplifies the development, management and deployment of powerful solutions for departments, branch offices and medium sized organizations.



(+5 Client)
\$4799

(+5 Client) Upgrade
\$2349

Websearch: MTS224

Websearch: MTS224

Microsoft Visual C++ 6.0

Nearly all world-class software, from the leading Web Browsers to mission-critical corporate applications, is built using the Microsoft Visual C++ development system. Visual C++ is the most productive C++ tool for the highest-performance development for Windows and the Web. Visual C++ 6.0 brings a new level of productivity to C++, without sacrificing flexibility, performance and control.



PRO UPGRADE
\$399

PRO
\$769

STANDARD
\$155

Websearch: MSS064

Websearch: MSS063

Websearch: MSS062

Microsoft Visual Studio 6.0

The Visual Studio 6.0 development suite sets the standard for developer productivity and comprehensive design support with integrated features across all the popular languages. Visual Studio 6.0 Pro includes the complete set of development tools for building reusable applications in Microsoft Visual Basic 6.0, Visual C++ 6.0, Visual J++ 6.0, or Visual FoxPro 6.0. Visual InterDev 6.0 provides easy integration with the Internet and a full Web page authoring environment.



Pro Upgrade
\$859

Pro
\$1670

Enterprise Upgrade
\$1699

Websearch: MSS054

Websearch: MSS051

Websearch: MSS056

Microsoft Windows NT Workstation 4.0

Powerful Performance and Reliability

Key Features:

- Ease of use
- Secure, easy access to the internet and Corporate intranets
- Improved network integration
- Improved management features
- Mobile computing
- Multimedia and graphics improvements
- Application programming interfaces and additional features



ONLY
\$469

UPGRADE
\$225

Websearch: MTC461

Websearch: MTC461

Microsoft Windows NT Terminal Server

Windows NT Server 4.0, Terminal Server Edition, is a Windows NT operating system product that will add Windows-based terminal support to Windows NT Server and a "super-thin client" to the Windows family product line. Terminal Server brings the Windows experience to desktops that cannot run Windows today.



(+10 Client)
\$2955

(+5 Client) Upgrade
\$2589

Websearch: MTC461

Websearch: MTC461

Microsoft MOLP

Save Money. Save Time. Stay Legal.

The Microsoft Open License offers your organisation volume discounts on the Microsoft product licenses you need. This simple, straight forward licensing program also saves you time and resources - you order multiple licenses at once and the license certificate you receive does not take up valuable space with extra boxes, disks or documentation sets

Call 1300 300 003 For Quotes

Microsoft Visual Basic 6.0

Join over three million professional developers in using Visual Basic and begin using the most productive tool to create powerful applications fast. Once you've learned the basics, move up to the Professional Edition and compile your applications to native code, create reports with drag-and-drop ease and build applications for the Web.



PRO UPGRADE
\$410

PRO
\$765

Standard Learning Edition
\$155

Websearch: MSS059

Websearch: MSS059

Websearch: MSS059

Microsoft SQL Server 7.0

As the most robust database for the Windows Family, SQL Server is the Relational Database Management System of choice for a broad spectrum of corporate customers and Independent Software Vendors building business applications. Customer needs and requirements have driven significant product innovations in ease of use, reliability, scalability and data warehousing.



#1
Microsoft Reseller!

(+5 Client)
\$2169

(+5 Client) Upgrade
\$1055

Websearch: MSS119

Websearch: MSS229

Encarta Interactive World Atlas 2000

Explore the world from your desktop. Spin the globe, zoom in for details or point to a place of interest. Dynamic 3-D maps and world cultures come to life on your PC, turning geography into a great adventure.



Save \$20 On RRP

ONLY \$79

Websearch: MSS263

Encarta Reference Suite 2000

Encarta Reference Suite 2000 combines comprehensive content and advanced technology to create an engaging educational experience on your PC in this award winning multimedia reference suite. Includes Encarta Deluxe, World Atlas and English Dictionary, plus monthly updates via the internet.



\$160

Websearch: MSS259

Age of Empires II: The Age of Kings

Age of Empires II spans 1,000 years, from the fall of Rome through the Middle Ages, in which players control the destiny of one of thirteen civilizations. The game keeps the epic scope of Age of Empires' gameplay while evolving the combat and economic features.



Save \$15 On RRP

BEST SELLER \$75

Websearch: MSS146

Flight Simulator 2000

Microsoft Flight Simulator 2000 presents breathtaking 3D landscapes and a larger fleet with two new aircraft to fly. Plus, with over 20,000 airports, you can land just about anywhere in the world. Get ready to soar.



Save \$20 On RRP

PRO \$119

STANDARD \$79

Websearch: MSS266

Websearch: MSS265

Links LS2000

Microsoft Links LS 2000 is the newest edition of the all-time best-selling golf simulation. More than 17 years of passion and precision have evolved into LS 2000-the most realistic golf experience possible on the PC. The ball physics of Links LS are so accurate, you can adjust your stance, club-face angle, and swing plane to set up a high-arching wedge shot that will actually back up on the green, just as it would on a real course! Links LS immerses you in a tournament environment with galleries of thousands to cheer your best shots.



Super Low Price

JUST \$60

Websearch: MSS267

Picture It! 2000

Make good pictures look great...and have more fun using them! Picture It! 2000 makes photo editing so easy that anyone can create professional-quality cards, calendars, collages, Web pages and more! Capture your photo from any source: digital camera, scanner, floppy disk or the Internet. Then let Picture It! 2000 guide you through every step and give you lots of graphic elements to play with: photos, frames, backgrounds and textures. It's so simple with Picture It! 2000



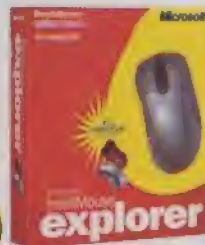
Huge Savings

JUST \$60

Websearch: MSS274

Intellimouse Explorer

IntelliMouse Explorer uses a new optical sensor called IntelliEye. This sensor scans the surface beneath the mouse 1,500 times per second to accurately and crisply track the smallest motion. It works on hundreds of surfaces (i.e., no mouse pad required) and stays precise because there are no moving parts to wear out or stick.



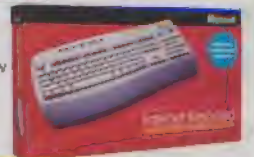
Best Seller

ONLY \$89

Websearch: MSS576

Internet Keyboard

The Internet Keyboard has 10 Hot Keys on a comfortable standard keyboard design that also includes a detachable palm rest. The Hot Keys allow you to browse the web, or check e-mail directly from your keyboard. The IntelliType Pro software also allows you to customize your hot keys.



A Must Have!

JUST \$49

Websearch: MSS264

Sidewinder Force Feedback 3.0

Feel true-to-life feedback - from subtle sensations to raw power forces. Experience multiple forces simultaneously. Even feel which direction the forces come from. Only Microsoft force feedback technology puts you right inside the game so you can react quickly and decisively to win.



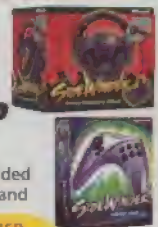
Feel The Force

OUR PRICE \$225

Websearch: MSS001

Force Feedback Wheel

The SideWinder Force Feedback Wheel is a compact, yet rugged state-of-the-art force feedback enabled PC steering wheel that includes an easy to release clamp for quick attaching and removing, sturdy, non-slip pedals.



Sidewinder Gamepad Pro Gamepad

SideWinder Game Pad Pro has revolutionized the control provided with a dual precision D-pad which features both proportional and digital control.

WHEEL \$269

GAMEPAD-USB \$66

Websearch: MSS003

Websearch: MSS270



1300 300 003

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MYOB is Australia's favourite

Why choose MYOB?

MYOB Australia develops and publishes award winning software solutions that have revolutionised the way growing businesses view accounting and business management software. The MYOB business product range includes MYOB FirstAccounts, MYOB Accounting, MYOB Accounting Plus, MYOB Premier Accounting, MYOB AssetManager, MYOB PowerPay.

• GST Ready - now!

MYOB accounting products handle both the current Wholesale Sales Tax (WST) and Australia's forthcoming GST.

• Made in Australia for an Australian GST

Australia's GST and business requirements are unique. Don't accept imitations or adapted products from overseas. MYOB developed their GST versions in Australia, specifically for the Australian GST. Who better to cater for Australian businesses than a successful Australian business?

• Easy to use, award winning software

MYOB keeps it simple. In November 1999 the experts at Australian PC User Magazine declared MYOB Accounting as the 'Best Accounting Product of 99' and scored it highest in the categories of support, commitment to the GST and overall value.

• Ask your accountant

More Australian accountants recommend MYOB than any other accounting software - MYOB software makes it easy for you and your accountant to work together.

• Australia's leading accounting software

MYOB software is used by over 180,000 Australian businesses.

• Backed by our industry-leading support services

As well as great software, MYOB also offer the services of one of Australia's leading technical support teams and a nationwide network of MYOB Certified Consultants.

Go direct to www.iswh.com.au/myob

MYOB & Microsoft Small Business Value Pack

- Combines MYOB Accounting with Microsoft Office 2000 Small Business Upgrade
- Includes a suite of productivity applications including Word 2000, Excel 2000, Outlook 2000, Publisher 2000 and Microsoft Small Business Customer Manager.
- MYOB's OfficeLink facility allows a seamless integration between MYOB Accounting and Microsoft Office
- Save an extra \$200 with the Direct Assistance Certificate from the governments GST Startup Assistance Office



Small Business Value Pack

\$499

Websearch: M55074

Small Business Value Pack Plus

- Combines MYOB Accounting PLUS with Microsoft Office 2000 Small Business Upgrade
- This product includes OfficeLink, time billing and fully integrated payroll facilities.



Small Business Value Pack Plus

\$639

Websearch: M55075

Save an extra \$200 with the direct assistance certificate from the governments

MYOB PowerPay

MYOB's powerful payroll solution.

As your business or organisation grows, managing your payroll becomes very complex, very quickly. Not only do you have more employees demanding 100% accurate pay on time but there are different taxes, more employer obligations and a lot more paperwork. PowerPay takes the stress out of pay day. PowerPay can process even the most complex payroll in minutes. Once you've processed the payroll, PowerPay generates all reports necessary to keep management and the taxman happy. In the past you needed to be a rocket scientist or a computer guru to use a powerful payroll system. That's where PowerPay is different: clever design elements, pioneered by the multi-award winning MYOB Accounting, have been applied to deliver a powerful payroll system which everyone can use.

Key Features:

- Windows 95/98, NT and Mac OS
- Prepares, processes and imports pay information
- Calculates and tracks leave
- Flexible and customisable
- Ability to import and export data
- Provides comprehensive and flexible reports
- Multi-level password protection
- Fully supported by MYOB Cover



ONLY \$419

Websearch: MYO028

MYOB FirstAccounts

Your ideal first accounting system, MYOB FirstAccounts makes it easy for you to track income and expenditure, reconcile bank statements, create and print invoices, statements, and purchase orders, track who owes you money and who you owe money to, produce profit & loss and other key reports with a mouse click. No business is too small for FirstAccounts. Outgrown Quicken, MSMoney? You can easily move up to MYOB FirstAccounts. FirstAccounts is designed for small service businesses and includes all the features you need today, and a growth path for the future. If as your business grows, you want more power, flexibility and analysis you can easily upgrade to any of the MYOB Accounting products. No re-keying of data is required. You can upgrade without stopping business.

MYOB FirstAccounts v3 also adds these functions (available across the whole range):

- User-definable ageing - choose 7-14-21 days or whatever you want
- Electronic bill payment to save you time and money
- Multiple customisable forms

• Windows 95/98 Windows NT And Mac OS 8 Or Later

Made in Australia, for Australian Businesses

Accounting and business requirements differ greatly between countries. That's why FirstAccounts has been created in Australia, for Australian businesses. Only MYOB creates world-class accounting solutions specifically for Australian businesses.

GST Ready



NEW PRICE
\$159



Websearch: MYO035

MYOB Accounting

MYOB Accounting Version 9 builds on all of MYOB's award-winning features and is now ready for Australia's forthcoming GST. MYOB Accounting Version 9 handles both the current Wholesale Sales Tax (WST) and the GST with ease, which means you can start to prepare now and smoothly make the transition from WST to GST. The extensive GST features allow you to easily collect, pay and report GST. New features include: accrual and cash-based GST reports, the Australian Business Number on all invoices and statements and GST entry fields in all relevant transaction entry screens. MYOB Accounting also includes: Invoicing, Receivables, Purchasing, Payables, Cashbook, Powerful Inventory, Job Costing, General Ledger and OfficeLink - a dynamic link to Microsoft Office. Everything you need to build a better business.

- 100 Predefined charts of account.
- Fully integrated package.
- Password protection - right down to individual windows.
- Up to 13 fiscal periods per year.

• Windows 95/98 Windows NT And Mac OS 8 Or Later

GST Ready



JUST
\$319



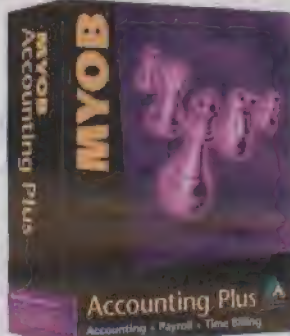
Websearch: MYO034

MYOB Accounting Plus

Accounting + Payroll + Time Billing

MYOB Accounting Plus includes all of the features found in MYOB Accounting and adds a fully integrated payroll and for the first time, a heavy duty professional time billing module. As well as meeting the needs of thousands of different types of small businesses, MYOB is now just right for professionals such as consultants, lawyers, accountants, graphic designers and anyone who bills by the time they spend with a client or on a project. MYOB Accounting Plus extends MYOB Accounting with a fully-integrated payroll. Integrated means that whenever you process your pay the rest of your accounting system is automatically and instantly updated. This saves time and eliminates synchronisation errors found when using a non-integrated payroll.

- Automatically calculates P.A.Y.E. tax.
- Prints pay cheques and/or pay slips.
- Automatically calculates superannuation, workers compensation and other employer expenses.
- Calculates and tracks sick, long service and annual holiday leave entitlements.
- Handles hourly, salaried, overtime, bonus and commission earnings.
- Processes Prescribed Payments System (PPS) deductions and remittances.
- Prints group certificates on Australian Tax Office continuous-form stationery.
- Generates all the information you need to fill in group certificates manually, if preferred.



www.iswh.com.au/myob

• Windows 95/98 Windows NT And Mac OS 8 or later

GST Ready

\$469

Websearch: MYO034

MYOB Premier Accounting

Multi-user accounting that's as easy as MYOB

All the accounting features of MYOB Accounting Plus, with additional features tuned for use across a network by multiple users. Exciting new features include the ability to handle multiple currencies, and enhanced inventory providing multi-level pricing, quantity breaks and user definable fields. MYOB Premier brings the power, flexibility and award-winning ease-of-use of MYOB to multiple concurrent users. Includes access for 3 concurrent users with additional licences easily added.

MYOB Premier includes the following functions:

- Cheque book (cash book).
- General Ledger.
- Invoicing and Receivables (debtors).
- Purchases and Payables (creditors).
- Extended Inventory.
- Professional Time Billing.
- Multi-currency.
- Integrated Payroll.
- Card File (customer/supplier database).



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www.iswh.com.au/myob

• Windows 95/98 Windows NT And Mac OS 8 or later

GST Ready

\$865

Websearch: MYO013



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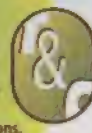
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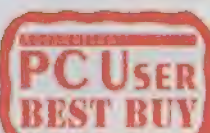
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QuickBooks & QuickBooks Pro With Payroll

Need business financial management and accounting software. Look no further.
QuickPayroll Pro works seamlessly with QuickBooks V7 financial management and accounting software to transfer payroll information directly into the company's accounts.



QuickBooks GST Version 7 Out Now!!

Payroll Pro

"The Best and Easiest to Use Release of Payroll Ever"

QuickPayroll PRO is designed for small to medium sized companies, and can manage up to 999,999 employees. The software keeps track of all employee pay details, prints pay slips and transfers pays. It also tracks superannuation contributions and tax and group certificates, calculates tax payable, leave accrued, work cover and provides quick access to all payroll information in over 70 different report formats.

With recent changes in Government Legislation now requiring all employers to report FBT and back payments of salary and wages when compiling group certificates, all QuickPayroll customers must upgrade to this latest version in order to comply with the new Australian Taxation Office reporting regulations, enabling you to print directly onto the revised group certificate format.

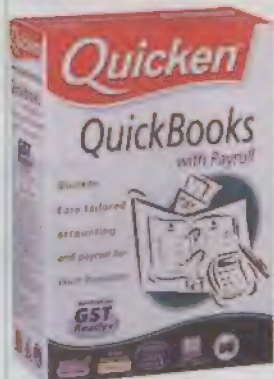
Quickbooks V7 & QuickBooks Pro V7

QuickBooks is the world's best selling financial management and accounting system for small and medium sized businesses, and is recommended by more accountants worldwide than any other software of its kind.

"Meets all the demands of businesses with inventory and double entry accounting"

By showing exactly what you owe, to whom and when, QuickBooks 7 keeps track of your company's bank balances, loans and other finances, calculates charges on overdue payments, monitors unpaid bills, writes cheques, records stock and offers up to 79 different financial graphs and reports for you to access the financial status of your company at any one time. And for trouble-free tax reporting, QuickBooks 7 will also code each and every transaction you've made, making it the quickest and easiest way to manage your business finances.

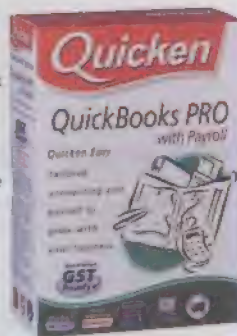
GST Guaranteed



RRP \$349

JUST \$389

Websearch: Q01162



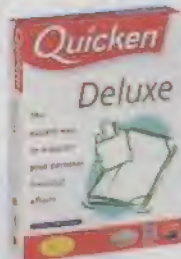
RRP \$550

ONLY \$475

Websearch: Q01170

Don't Pay RRP Prices

Quicken Deluxe V7



Personal Finance Management Software

With Quicken, organising your personal finances has never been faster, more simple, or more accurate. Quicken puts and keeps you in control. Track all bank accounts, credit cards, loans, mortgages and investments. And with "Move Transactions" you can put your money where you want it, when you want it. Fast. What's more, Quicken is easier to learn, and even easier to use. All of which adds up to a clearer insight, leading to you making well informed and better business decisions at the click of a button and update your share portfolio instantly.

Track all your personal finances!

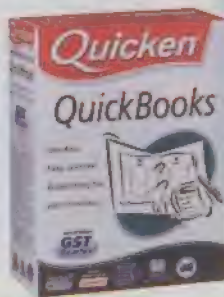
ONLY \$89

Websearch: Q01141

QuickBooks V7

QuickBooks is the easy to learn and use, flexible, comprehensive and integrated accounting and financial management software package for small to medium size enterprises.

- Easier to work with your accountant.
- Increased report functionality.
- Increased efficiency.
- Customising company information.
- Now GST ready.



TECHNOLOGICAL UPGRADE \$89

RRP \$109

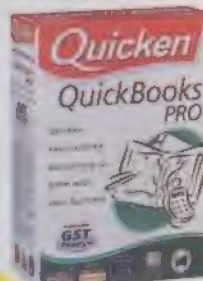
OUR PRICE \$175

Websearch: Q01162

QuickBooks Pro V7

Also features:

- Advanced job costing and budgeting.
- 90 reports and graphs.
- Estimates for better quoting.
- Time-tracking/on-screen timer.
- Multi-user enabled (option for additional licences).



TECHNOLOGICAL UPGRADE \$149

OUR PRICE \$299

Websearch: Q01171

Websearch: Q01171

Qudos Quality Manager Toolkit 2000

Quickly, easily and effectively develop your own ISO 9000 Quality System.

The latest development of a product that has been tried and tested for over 5 years - Qudos QM Toolkit 2000 provides the tools you need to develop your own quality system. Includes policy manuals, procedures, forms, job descriptions and letters. These are ready for use or customising in MS Word 97 and 2000. A comprehensive Guide Book, handy ISO 9000 Quick Reference Guides and a series of training presentations make developing and implementing your system even easier. Just add your unique knowledge of your own business!

Key Benefits:

- Low price - only a fraction of consultant's fees
- Long and successful track record
- Addresses current and new draft ISO 9000 1 standards
- Works with your familiar word-processor
- Work at your own pace

**Also Includes
FREE UPDATE OFFER,
TRIAL DATABASE & FLOW
CHART SOFTWARE.**

\$269

Websearch : TQA009

**New
Version!
Be ready for
ISO9000:2000**



QM Bundle (Toolkit, Database, Essential Business Forms)

\$435

Websearch : TQA012

Qudos Quality Manager Database 2000

Cost-effective business management systems - without bulging filing cabinets!

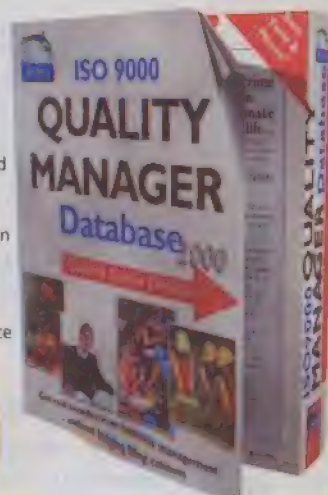
Already in use with many of Australia's leading companies and public sector organisations. Qudos QM - Database 2000 enables a quality or business management system to be efficiently and effectively managed from your PC. Helping you to maximise benefits while reducing administration and paperwork. Allows you to integrate quality, safety, environment and other business management systems. The modular design of Qudos QM - Database 2000 enables you to simply and easily perform numerous tasks including: control the approval, issue and revision of documents, maintain copyholder details, Launch files for display or editing in any Windows application. Schedule, plan and record audits on your chosen range of subjects. Monitor audit progress with user-defined

query and report facilities. link an audit report to any requirements for improvement record and list improvements/non conformance plan Corrective and Preventive actions and monitor progress with user-defined query and report facilities. Schedule, plan and record minutes of meetings on any subject. Default agendas can be created for any meeting type you choose. NEW! Human Resources module for maintaining details of employees, consultants etc. Plan and record Employee Performance Reviews with objectives, achievements and customisable rating system. Plan and record training courses, attendance and details of training providers.

**NETWORK LICENCES ALSO
AVAILABLE**

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Websearch : TQA010



Qudos Office PLUS!

100s of instant business solutions for Microsoft Office!

Few of us achieve all the potential benefits that the world's most popular office suite has to offer. The solutions in Qudos Office PLUS! help you to make instant, productive use of the various MS Office applications and unleash some of that potential! Ready for immediate use or easy customising in your familiar applications. An extensive 'Help' file and 'Tech tips' are

provided. A 'must have' product for all business users. Suitable for use with MS Office 97 or above. Word, Excel and PowerPoint files may also be used with Office 98 for Mac.



Sample files include:

- 170+ forms for Word
- 6 access Databases
- 130+ letters for Word
- 20+ PowerPoint presentations
- 40+ workbooks for Excel
- 90+ sound files for your presentation

**A must for office
users!**

\$59

Websearch : TQA011



Essential Business Forms.....	TQA013	\$19.95
Essential Business Letters	TQA008	\$19.95



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see Terms & Conditions



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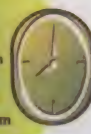
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Protecting businesses and workers remains a major business and social issue in Australia, to the extent that 300,000 employees are injured every year as a result of workplace hazards and accidents. Most small to medium business owners are aware of the substantial costs attributed to absenteeism as a direct result of injuries, but it is the indirect costs such as re-training, costly litigation and fines, and the lost productivity which provide cause for even greater concern. MAUS Business Systems have invested heavily in consolidating the best advice and planning format to address health and safety management plans for small to medium businesses. MAUS Health and Safety Planner is a comprehensive, step by step software package that will allow you to create your own Occupational Health and Safety Plan quickly and easily.

Examples of key areas addressed include:

- Compliance with legal safety procedures.
- First aid in the workplace.
- OHS structure and system.
- Management of risk in the workplace.
- Accident and incident reporting and investigation.
- Emergency procedures.
- Formation of the OH and S committee.
- Safety performance monitoring.



ONLY
\$175

Websearch: MAU015

MAUS Employee Manual

Create a Customised Employee Manual!

MAUS Employee Manual is the simplest way to create a handbook encompassing all of your organisation's employee policies and procedures. It comes complete with sample policies that you can use, in addition to all the important forms you may need. The program's unique step-by-step process will ensure that your business has its own customised manual, protecting it from all-too-common litigation in areas such as Unfair Dismissal and Sexual Harassment. Protect your business today!

- Helps fulfil your legal obligations.
- A Step-by-step Questions & Answers format.
- Comes complete with over 70 policies, procedures and forms.
- Improve productivity and motivation amongst all employees.
- No expensive consulting, royalty or commission fees.
- Publish your manual in hard copy and on your network or intranet.



ONLY
\$165

Websearch: MAU011

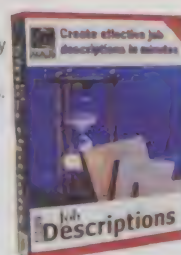
MAUS Job Descriptions

Write job descriptions in minutes!

MAUS Job Descriptions will help you create clear, concise job descriptions in minutes! Simply choose from the thousands of built-in jobs and edit or even combine duties from different jobs. Next, use the simple question and answer approach to address the physical and educational requirements, work environment, qualifications and supervisory responsibilities. MAUS Job Descriptions will then take your answers and write a comprehensive job description that's fully customised to your organisation.....*It's that fast. It's that easy*

Key Benefits

- Create job descriptions in minutes.
- Over 3,500 sample job descriptions to choose from.
- Hire the right people.
- Improve productivity.
- Protect your organisation against unfair dismissal claims



ONLY
\$165

Websearch: MAU005

MAUS Performance Review

For fast, effective employee appraisals!

Described by PC Authority as "one of the first products any manager should load onto their PC", MAUS Performance Review will help you create accurate, personalised employee reviews in minutes! Simply choose from the dozens of performance criteria such as initiative, leadership, problem solving ability, and sales skills.....to name just a few! Next, use the simple 1 - 5 grading system to rank your employees in each area.

MAUS Performance Review will then support your ratings with clear, effective text...

...*It's that fast. It's that easy!*

Key Benefits

- Save 50-90% of the time to write employee reviews.
- Simple step-by-step approach.
- Record ongoing problems and achievements.
- Accurate, personalised reviews.
 - Clear, natural text flows.



ONLY
\$165

Websearch: MAU004

MAUS Job Descriptions & Performance Review

PC Users BEST PRODUCTS OF 1998

WHAT THE PRESS ARE SAYING:

"Job Descriptions offers 3,500 professional descriptions and Performance Review gives a list to follow when judging staff performance."

Sydney Morning Herald
(18th August 1998)

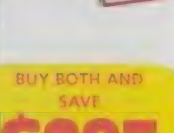
"...Ideally designed to be used in conjunction with job interviews, HR planning and annual staff reviews"

The Age (25th August 1998)

"...simple, affordable, revolutionary"

Instore Magazine (September 1998)

6/6 Value for Money
PC Authority (October 1998)



BUY BOTH AND
SAVE
\$295

Websearch: MAU006

Project Management the Easy Way!

MAUS Project Planner



MAUS Project Planner makes managing activities and projects in your business easy. It tracks and schedules all vital information - costs, labour required, available resources, deadlines and much more. You can make your projects as simple or detailed as required and view instant reports, graphs (including Gantt charts and Actual vs Budget comparisons), task details and employee notes. It even creates instant action plans for you and others to follow!



For More Info On All The
Maus Products Visit
www.iswh.com.au/maus

Key Benefits

- Makes managing projects easy
- Helps you reduce costs, meet deadlines and use resources efficiently
- Creates instant reports and graphs
- Includes Gantt Charts for easy scheduling
- Stores all task and employee details
- Links to MAUS MasterPlan, MS Word and Excel
- Creates instant action plans



ONLY
\$169

Websearch : MAU018

Business and Marketing Plans the Easy Way!

MAUS MasterPlan Pro

MAUS MasterPlan is the easy way to create professional Business and Marketing Plans. A simple question and answer format leads you through the entire planning process, allowing you to analyse, improve and grow your business. The award winning software creates full financial forecasts, strategies and graphics all at the click of a button. The new MAUS MasterPlan has a broad range of new features specifically designed to meet the needs of Australian users in both product and service industries. Topics covered include Sales Analysis, Market Analysis, SWOT Analysis, Marketing Plan, Financial Plans and Actual vs Budget comparisons.

MAUS Consultant's Pack

Establish a successful Business Planning Consultancy

Used by 1000's of Accountants and Consultants, the MAUS Consultant's Pack will give you the forms, tools and know-how to establish a successful Business Planning Consultancy overnight. Includes information on setting up your consultancy service, promoting and costing your services, impressing your clients and a step-by-step guide for every assignment. Software contains over 80 pages of forms and management question checklists, overheads for training, sample proposals, press releases, advertisements and much more!

Includes:

- MAUS MasterPlan Consultant's Edition
- New customisation features
- Consultant's guide to business planning
- Unique consultancy software
- Questionnaires for clients
- Complete training manual



Used by 1000's
of accountants and
consultants



WHAT THE PRESS ARE SAYING

"The brilliance of this system is that you're led through the entire process step by step... the results will be as good as anything a professional would have provided for you".



000000 6/6 Ease of Use
000000 5/6 Features
000000 5/6 Value for Money
000000 6/6 Overall



PC Authority (January 1999)



MAUS
MASTERPLAN FOR
WINDOWS - LEVEL 2
PROFESSIONAL
\$165

Websearch : AU5501

Easy Start Sharemarket Software

MAUS Stockmarket Plus

Over 5.5 million Australians are now investing in the stockmarket.....grab your slice of the action! 3 Great Reasons to Choose MAUS Stockmarket Plus

- 1 Portfolio Manager - Records every aspect of your share portfolio you'll ever need in an easily accessible format.
- 2 Charting & Query Tools - Pinpoint new and exciting investment opportunities using the user friendly charting and query functions.
- 3 Instant Tax Reports - Save literally hours of frustration at tax time using the automatically generated Australian Tax Reports.

Key Benefits

- Professional investment advice in simple English
- Manage stocks, personal finances, property, etc
- Track investments in any ASX listed company
- Download stock prices for fast, accurate analysis

MAUS Stockmarket Plus...."is ideal for both novice and experienced investors who require a package to keep track of their stockmarket investments...."

Seldom does a software package completely outclass competitors, offering users a clearly superior product in terms of sophistication, simplicity and obvious attention to detail"

Review of core software - Personal Investment Magazine, 1997

MAUS Stockmarket Plus...."is specifically designed for monitoring a share portfolio and has the added advantage of providing analytical tools as well as keeping the records you need"

Review of core software - Editor of Money Section (SMH 17/9/97)



ONLY
\$165

Websearch : MAU007

For More Info On All
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The Ultimate MAUS Business Packages

	Normal Price	Bundle Price		
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MAUS Master Plan Pro + Stockmarket Plus	\$338	\$308	MAU017	Websearch : MAU017



Dragon Naturally Speaking Preferred v4

"Continuous speech recognition, ground breaking technology, award winning performance". The only voice recognition program in the market that is specifically designed for Australian dialect.

Dragon Naturally Speaking is the world's first and foremost software product that recognises and creates text from normal continuous speech. Dragon Naturally Speaking is acclaimed in competitive reviews for its accuracy, performance and ease of use. Just talk to your PC naturally, at a conversational pace. Dictate entire paragraphs at a time, write email messages, create reports, draft letters and edit proposals just by speaking.

Top Features

- **High Accuracy** - PC Magazine reported Dragon Naturally Speaking "achieved 98 to 99% accuracy" in competitive testing!
- **Very Large Vocabulary** - A vocabulary of 250,000 terms and more than 160,000 active words assures that: What you say is what you get.
- **Control Your Desktop** - Open applications from the Start menu, switch from one application to another, and give commands like "Start Internet Explorer" by voice.
- **Multiple User Support** - Different users can share the same program by creating and storing their voice files on the same computer

- **Fast Setup** - Learns your voice in just a few minutes so you can be up and running quickly!
- **Broad Compatibility** - Dictate into virtually any Windows application, including Microsoft Word 97 & 2000, Corel WordPerfect 8 & 9, America Online and Lotus Notes.
- **Internet-Friendly** - Browse the Web and use hotlinks by voice, when using Microsoft Internet Explorer 4.0 & 5.0. Talk into chat rooms at up to 160 words per minute!



**New Australian
Version**

\$289

Websearch : DRG009

Dragon Naturally Speaking Mobile

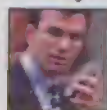
**Continuous speech recognition for people on the move
Create text anywhere**

Dragon Naturally Speaking Mobile is the complete speech recognition system for people on the move.

- Holds up to 40 mins of continuous speech on built-in memory cards.
- An additional 80 mins can be stored on removable memory cards.
- Speak at up to 160 words per minute.
- File your recordings into folders for ease of use.

**Don't Be Chained To Your PC. Talk
To Your PC Anytime Anywhere.**

Its so easy!!



Press 'Record' button and speak into the recorder's built-in microphone.



Select which recordings you want transferred to the PC.



Connect the recorder to your PC using the included cable.



Press 'Transcribe' and your recorded speech appears as the text on your screen and in your document.

**Save
\$50 On
RRP**



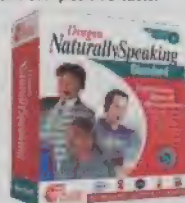
\$449

Websearch : DRG006

Standard V 4.0

Standard Version features:

- **High Accuracy** - up to 99% accuracy in independent competitive tests.
- **Huge Vocabulary** - With around 250 000 terms and 160 000 active words - what you say is what you get!
- **Fast Setup** - Dragon recognises you after just a few minutes of "training".
- **Multiple User Support** - Family and friends can also control your computer by their voices once you have "trained" your computer to recognise them.
- **Broad Compatibility** - Works in a huge range of software packages from Microsoft, Corel, Lotus etc.
- **Internet Friendly** - Browse your favourite sites and the web using your voice. Talk in a chat room at up to 160 words per minute!



\$175

Websearch : DRG008

Essentials V 4.0

The ideal introduction to the world of voice controlled computing. For users 9 years and above, Essentials can be "trained" in five minutes. It is powerful, fast, fun and accurate, yet incredibly easy to use. Can be used in almost any Windows application. Dragon Naturally Speaking Essentials is the ideal, affordable introduction to continuous speech recognition for users age 9 and older.



\$85

Websearch : DRG010

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Best Dragon
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(EST) Saturday



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see page 56 for
terms and conditions.





LINUX OS

A powerful, easy-to-use operating system designed specifically for your desktop

Experience Linux power built specifically for the desktop with Corel LINUX OS. Based on Debian and featuring an incredible four-step installer and a drag-and-drop desktop environment based on KDE and Qt, Corel LINUX OS is easy to install and configure. Access local and network drives and the Internet with an innovative browser-style file manager. Plus, easily obtain system updates over the Web. With outstanding file compatibility and network integration, Corel LINUX OS is an exciting development in operating system evolution.

- The beginning of the new millennium is the perfect time for Linux to unleash a true alternative to Windows on the desktop and the new Corel Linux / Graphon technology will accelerate this process.
- LINUX OS can be integrated with GraphOn Bridges into Corel so it will be easy to enjoy the benefits and high reliability of Linux while having access to the most widely used Windows applications. This will enable organizations and individuals to mix Linux and Windows desktops seamlessly which is a prime goal of Corel in our Linux development.
- LINUX OS is for the consumer as well as the enterprise markets, featuring easy installation and the most user-friendly Linux operation to date.
- Experience Linux power built specifically for the desktop with Corel LINUX OS. Based on Debian and featuring an incredible four-step installer and a KDE-based, drag-and-drop desktop environment, Corel LINUX OS is easy to install and configure.

Easy Installation with Corel Install Express

- Lets you install Corel LINUX OS in four easy steps
- Automatically detects most PCI hardware
- Provides integrated partitioning to allow a dual-boot system
- Includes custom install option
- Offers a comprehensive Help System

Easy File Management with Corel File Manager

- Features a friendly, graphical drag-and-drop design
- Lets you browse local and Windows network drives
- Allows Web browsing and FTP Internet file transfers

Graphical Control Center / Easy-to-Use Graphical Desktop

- Enjoy a friendly, uncomplicated work environment with enhanced KDE desktop
- Set your IP address, gateway, DNS server and domain server quickly and easily in the graphical Control Center
- Easily install printers with an enhanced graphical interface

Easy System Updates

- Easily update your system over the Web*
- Install new applications with just a few clicks

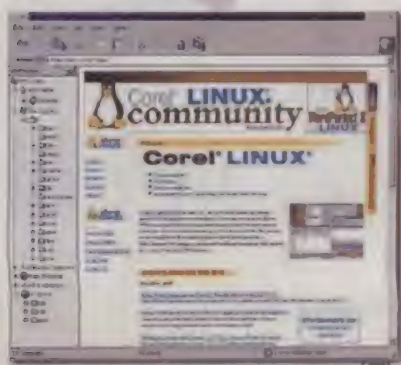
Outstanding Compatibility

- Easily share Windows files
- Compatible with other Linux software
- Seamless integration with Windows and UNIX / Linux networking environments
- Internet connection required



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For Linux
available in
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now!**

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subject to change,
see page 56 for
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**CorelDRAW 9**

The world's number one PC illustration and image-editing
program for professionals

Major Applications:

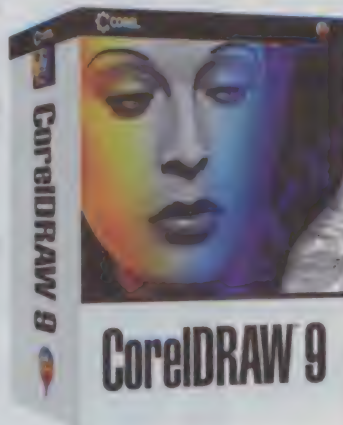
- CorelDRAW 9 - illustration and page layout
- Corel PHOTO-PAINT 9 - image editing and bitmap creation

Suite-Wide Features

- Robust PDF support, including import and export, job ticketing, bookmarks, image downsampling and more
- Enhanced printing features - imposition layout, preflight warnings, miniature preview to verify changes and downsampling of bitmaps
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- Interactive tools including Perspective Drop Shadow, Fill, Blend, Transparency and more
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- Support for Adobe Illustrator AI, EPS and Adobe Photoshop PSD with layers and MetaCreations Painter RIFF files

Libraries

- 25,000 professional clipart
- 1,000 TrueType and Type 1 fonts
- 2,500 high-resolution photos



**Educational
Pricing Available**

UPGRADE
\$415

Websearch: CDR271

**CorelDRAW 9
Premium Colour
Edition**

Enjoy phenomenal control over output quality with
CorelDRAW 9 Premium Colour Edition. This sophisticated suite
combines award-winning Corel Graphics software with intelligent colour
calibration technology from Heidelberg.

- Experience true creative freedom with the legendary vector illustration and page layout features of CorelDRAW 9 and the powerful image-editing and painting tools of Corel PHOTO-PAINT 9
- Innovations like the Mesh Fill tool and Artistic Media brushes expand your capabilities. Robust PDF support and advanced imposition tools maximise your productivity
- With enhanced printing features and accurate colour profiling for input, display and output devices you'll get superb results



**Save
Over \$125
On RRP!**

UPGRADE
\$779

Websearch: COR325

**Corel PHOTO-PAINT 9
Digital Camera Edition**

Give your digital photos a professional touch with Corel PHOTO-PAINT 9 Digital Camera Edition. This comprehensive photo-editing and painting package helps you get the most from your digital camera and computer by providing tools for fast, easy image enhancement. Support for over 120 digital camera models makes transferring pictures to your PC effortless. Powerful painting tools let your creativity soar! With over 70 special photo effects and hundreds of customizable templates, it's easy to turn digital images into stunning projects for print, e-mail or the Web - to share with family, friends and business associates. Make your photos winners with Corel PHOTO-PAINT 9 Digital Camera Edition.



NEW!

UPGRADE
\$139

Websearch: COR570

**CorelDRAW 9
Office Edition**

Give your professional ideas maximum visual impact with CorelDRAW 9 Office Edition. An essential complement to your business software, this dynamic graphics suite combines extraordinary ease of use with award-winning illustration and image-editing tools.

- Produce professional-looking presentations, reports, marketing material and Web pages using wizards and customizable templates
- Create flowcharts and organizational charts quickly and easily
- Increase your productivity with an intuitive interface and exceptional file compatibility, including full integration with WordPerfect, Corel Presentations, Microsoft Word and Microsoft PowerPoint and seamless file transfer with CorelDRAW 9 Graphics Suite
- Choose from a collection of business-specific clipart images and templates to enhance your work. CorelDRAW 9 Office Edition - visual communication for business.



UPGRADE
\$235

Websearch: COR336



WordPerfect Office 2000

Finally, an office suite that understands the way you work. Perfect for your business, it's packed with features that make life easier. Increase productivity with voice-enabled word processing. Share files across most major applications and customise programs with support for Microsoft Visual Basic Applications. Create your own business material, such as letterheads and brochures. Produce spreadsheets that give data real meaning slide shows that really make an impact and publish Web pages from the core applications without knowing HTML. It's all about getting the job done right, with suite-wide integration, you can combine text, graphics and charts in one document. WordPerfect Office 2000. Today's office solution.

WordPerfect Office 2000

Corel Presentations 9 - Create captivating, high-quality slide shows and drawings that leave a lasting impression with this dynamic presentations application. Enhanced Microsoft PowerPoint import/export capabilities. Redesigned Internet Publisher gives you step-by-step instructions on publishing a slide show to the Web.

Quattro Pro 9 - Turn numbers into meaningful information with this powerful spreadsheet program. Organise, analyse, report, manage and share data quickly. Increased notebook size now supports up to one million rows, giving you greater flexibility when converting Microsoft Excel files. Enhanced Microsoft Excel conversion capabilities.

Word Perfect 9 - Professional word processor, create outstanding documents, such as newsletters, reports, brochures, add graphics, charts and tables with ease. Enhanced Microsoft conversion capabilities. Corel RealTime Preview lets you preview formatting before applying it to your documents.

Corel Central 9 - Manage time and tasks efficiently with this effective information manager. Organise, store, and access communication and scheduling information with ease. PalmPilot Synchronisation lets you synchronise the Calendar, Event & Task Lists, Address Book & Memo applications.

Trellix 2 - Quickly organise documents and publish them to the Web without knowing HTML. Increase the availability of information throughout a corporation and reduce the workload by delegating content ownership to specific individuals.

RRP \$599



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\$59

Websearch : COR560

COREL OFFICE 2000

\$475

Websearch : COR548

COREL OFFICE 2000 U/G

\$239

Websearch : COR546

WordPerfect Office 2000 Voice-Powered Edition

Includes all the applications in Office 2000 plus:

Philips FreeSpeech 2000

- Use the power of your voice to create, edit and format documents in WordPerfect 9. Philips FreeSpeech 2000 uses high speed, high accuracy technology to dramatically improve recognition rates.
- Supports dictation by multiple users in multiple languages.
- EasyEdit lets you playback text for easy proofreading.
- Explore the Web with your voice.
- Voice-enhanced word processing means users can watch their words appear on screen as they speak to their computer at a normal pace up to 160 wpm.

RRP \$599



COREL OFFICE2000
VOICE

\$499

Websearch : COR549

COREL OFFICE 2000
VOICE UPGRADE

\$279

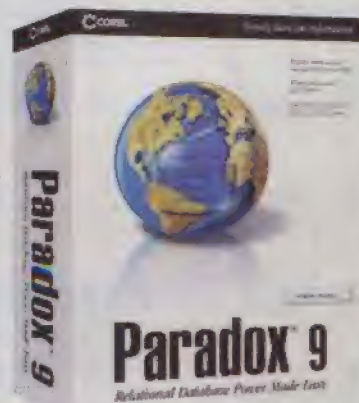
Websearch : COR547

Corel Paradox 9 Developers Edition

Turning Data into Information

Interpret, present and share information with an easy-to-use relational database designed for new users, experts and developers. Paradox 9 lets you see the meaning behind data, helping you make better decisions.

- Compatible and Web-ready, Paradox 9 makes it easy to exchange data across applications, including Microsoft Word and Microsoft Excel or publish it straight to the Internet.
- Powerful tools, including ObjectPAL, "enables" developers and advanced users create custom applications.
- Paradox 9 can run on a single computer or a multi-user network, so it's flexible enough to accommodate your changing needs.



RRP \$799

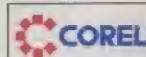
COREL PARADOX 9 DEVELOPER

\$585

Websearch Code : COR332

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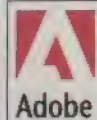
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Monday to Friday
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Terms & Conditions

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Extensis Suitcase 8.2

Everything You Need to Take Control of Your Fonts!

Put your fonts in order and put your focus on creativity. The best-selling font manager in the world is now a full set of powerful tools-and it's easy to use! Extensis Suitcase 8 is packed with exclusive, automated features that make it easier than ever to manage your fonts, freeing you to do your best creative work.



MAC ONLY
\$165

Websearch: EXT027

Extensis Portfolio 4.0

Extensis Portfolio 4.0 software tools have innovative client / server capabilities which makes it possible for you, your workgroup, or your entire enterprise to manage your valuable digital assets in visual catalogues! In fact, it provides fully-scalable asset management for enterprises! Plus, Portfolio 4.0 has advanced features including scripting for unlimited automation and workflow integration publishing catalogues on the Web, slide shows and importing fields from other databases.



PORTFOLIO 4
\$330

PORTFOLIO SERVERS
\$4320

Websearch: EXT030

Websearch: EXT031

Extensis QX Tools 4.0

Productivity Tools to Get More Into and Out of QuarkXPress 4.0

QX-Tools 4.0 is the Xtension package that focuses on the features you need and can use without a huge learning curve. QX-Tools 4.0 includes QX-VectorEdit, which allows you to convert PostScript, EPS files and PDF files into QuarkXPress artwork. Any applications that can generate Postscript such as Microsoft Excel, Microsoft Word, PowerPoint, Netscape Navigator and Autocad can also create art for use in QuarkXPress.



\$275

Websearch: EXT023

Extensis Suitcase Server

Stop running around with a floppy full of fonts! Suitcase Server makes sure that everyone in your design workgroup is using the same fonts. And it's easy to set up and use-most designers won't need to learn anything new! "...I was able to get the server up and running in less than 10 minutes".

Key Features:

- Synchronize fonts across a workgroup
- "Hands-off" operation
Access via the Internet Fonts are available even if the network goes down
- Familiar Suitcase 8 Environment



SERVER
\$325

Websearch: EXT028

Extensis Mask Pro 2.0

Cut complex masking down to size with Professional precision masking tools for Adobe Photoshop. Extensis Mask Pro 2.0 provides expert-level tools that dramatically reduce the time necessary for masking and selecting complex objects in Adobe Photoshop. With color matching technology, edge blending, intelligent edge detection and color selection, Mask Pro is the only masking solution that provides both fast and professional-quality results.

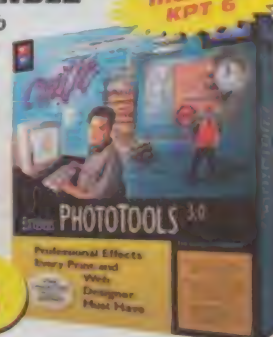


\$350

Websearch: EXT021

Extensis Phototools 3.0 & KPT 6 BUNDLE

Professional Effects Every Web and Print Designer Must Have. Extensis PhotoTools 3.0 contains major enhancements to its versatile collection of real-world special effect tools for print, multimedia and web design such as multiple light sources in PhotoCastShadow and textured surfaces in PhotoButton. In addition, PhotoTools 3.0 now includes KPT 6 bundle.



BUNDLE ONLY
\$365

Websearch: EXT029

INTELLIGENCE PRO 4

\$365

Websearch: EXT033

PREFLIGHT 2 PRO

\$695

Websearch: EXT035

PHOTOGRAPHICS 1

\$295

Websearch: EXT034

PHOTOFRAME 2

\$365

Websearch: EXT032



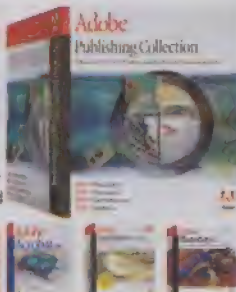
Adobe Publishing Collection

The complete package for the creation, assembly and delivery of printed & electronic documents

The Adobe Publishing Collection brings together the latest versions of four of the World's leading graphic software packages all in one box. But not only do they come as one - they work as one. Drag and drop features lets users move effortlessly between programs, ensuring a seamless workflow - whether for print, multimedia or online. A comprehensive and cost-effective way for users such as graphic artists and business professionals to start publishing.

Includes:

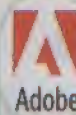
- Adobe PageMaker 6.5 Plus
- Adobe Illustrator 8.0
- Adobe Photoshop 5.5
- Adobe Acrobat 4.0



RRP \$2495

WIN MAC
\$1790

Websearch: ADO004
Websearch: ADO005



Adobe Web Collection

The cutting-edge collection for designing and managing premier Web sites. The Adobe Web Collection is a comprehensive software suite that gives you the power to design extraordinary still and interactive Web graphics, optimise those graphics for efficient downloading, and build dynamic Web sites that support the latest technology and standards. The collection includes three award-winning Adobe applications: Adobe GoLive 4.0, Adobe Photoshop 5.5, and Adobe Illustrator 8.0.



Adobe Number 1 Reseller

WIN MAC
\$1835

Websearch: ADO209
Websearch: ADO210

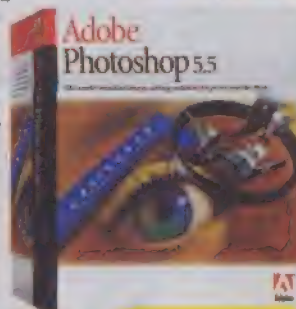


Adobe Photoshop 5.5

The world-standard image-editing solution for print and the Web

Adobe Photoshop 5.5 software offers new creative tools and web features and gives you the power of Adobe ImageReady 2.0 for advanced processing of Web graphics. Transform images with "painted" brush strokes, and perform complex masking tasks with professional-level precision. Complete all your essential Web functions including file optimisation right in Photoshop, and then jump to the ImageReady application to slice layered images, produce JavaScript rollovers and create GIF animations. Create original artwork, touch-up photos and add special effects with comprehensive filters. This integrated tool set maximises your productivity while helping you achieve the finest quality output.

RRP \$1495



WIN MAC
\$1079

Educational Pricing Available

Websearch: ADO192
Websearch: ADO193

For More Info On
Adobe Products visit
www.iswh.com.au/Adobe



Adobe Design Collection

Unleash your creativity with powerful, integrated Adobe design tools.

Together, the programs in this collection deliver a powerful set of professional graphics, layout, and publishing tools that form the basis for an exceptionally smooth design workflow.

Includes:

- Adobe InDesign 1.1
- Adobe Photoshop 5.5
- Adobe Illustrator 8.0
- Adobe Acrobat 4.0

RRP \$2895



No one else beats us on price

WIN MAC
\$2895

Websearch: ADO212
Websearch: ADO213



Adobe GoLive 4.0

The cutting-edge tool for creating premier web sites

From Paris to San Francisco to Tokyo, the web's top designers and developers use Adobe GoLive software to create and manage world-class web sites. When you look at the features it has to offer, it's no wonder that GoLive makes the web workflow easier than ever!

Visual Layout and Design

- Page layout mode
- Palette window
- Inspector
- Colour picker

Professional Source-Code Control

- Source-code editor
- HTML syntax checker
- HTML outline view
- XML support

Powerful Site Management

- Site window
- Dynamic components and templates

Cutting-Edge Production

- Built-in FTP client
- Site map printing
- QuickTime movie editor
- Ready-to-use javascript actions
- Easy-to-use DHTML
- Cascading style sheets



MAC
\$545

Websearch: ADO037

WINDOWS
\$545

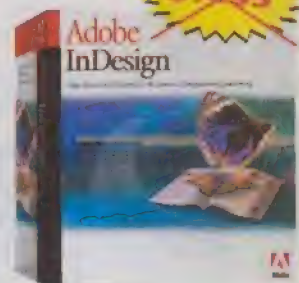
Websearch: ADO186



Adobe InDesign

Page layout and design for the future of professional publishing

Adobe InDesign software is a new, state-of-the-art page layout program that delivers unprecedented creative freedom, productivity and precision, while integrating seamlessly with Adobe's other leading design programs. Award-winning Adobe user interface - Enjoy design tools that work together to provide a seamless creative environment. InDesign, Illustrator, and Photoshop software looks, feels, and behaves similarly because of common tools, commands, palettes, and keyboard shortcuts.



We stock the entire range of Adobe products

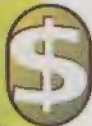
WIN MAC
\$1215

Websearch: ADO181
Websearch: ADO208



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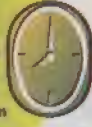
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FreeHand 9

The Professional Illustration and Layout Solution for Print and Web

FreeHand 9 is the print and Web Publishing solution. FreeHand offers support for animation, hyperlinks and integration with Flash 4 for even more interactivity.

- Express your ideas with break through creative tools
- Use perspective grids for accurate 3D effects
- Design like never before with live enveloping, vector transparency and multipage layouts
- Save time with streamlined interface, productivity features and blistering performance

FreeHand integrates tightly not only with Macromedia's Web publishing products, but also many others, including QuarkXpress, Photoshop and Acrobat.



\$750

Websearch: MAC317

Flash FreeHand Studio

The Complete Solution for High-Impact Print and Web Design

Flash and FreeHand offer the complete cross-media publishing solution. Design graphics and site concepts in FreeHand, using industry-leading creative tools, including multi-page layouts, 3D perspective grids and vector transparency. Then integrate into Flash, the Web standard for vector graphics, fusing vectors, bitmaps, motion, MP3 audio, form input and interactivity.

Upgrade now for your Free Flash 4 Training Video! (valued at \$49.95)



For Latest Price
\$899

Websearch: MAC318

Director 8 ShockWave Studio

The Standard for Creating and Delivering Powerful Multimedia

The solution for creating magnetic internet destinations and powerful multimedia director is the most powerful multimedia authoring solution available for professional designers today. This robust software improves on an already high level of programming quality, based on user guidance. With Director 8 you can:

- Accelerate your time to market with streamlined development process
- Dazzle your audience with rich content
- Reach more people through magnetic "destination content" such as interactive product demos, presentations and connected community applications easily accessed by the widely distributed ShockWave Player.



\$1795

Websearch: MAC319

Web Design Studio

A Complete Integrated Solution for Professional Web Designers

A powerful dream team - Go from concept to completion faster than ever before! With Dreamweaver, Fireworks and Flash, Macromedia makes it easy to build a world-class Web site. Tight product integration lets you efficiently design, edit and optimize graphics for the Web in Fireworks, then seamlessly integrate with DreamWeaver to produce and manage your site. Finally, use Flash to add animations, interactivity and sound to produce a high-impact site that plays back smoothly, even over low-bandwidth.

Educational Pricing Available



ONLY
\$895

Websearch: MAC090

Dreamweaver 3

The Solution for Professional Web Graphics Design and Production

With new Dreamweaver 3 you get

- The Quick Tag Editor-edit code at object level without leaving visual view.
- Support for MS Office files, including "Clean up word HTML"; no more word-proprietary tags; makes content integration even easier!
- Global HTML Styles - use text styles, including font mark up automatically; configure character and paragraph level styles; share the styles with your team without older browser hassles.



~~RRP \$569~~

\$485

UPGRADE
\$249

Websearch: MAC134

Websearch: MAC135

Fireworks 3

The Solution for Professional Web Graphics Design and Production

With new Fireworks 3 you get

- Automation of repetitive tasks using "History Panel"; record every move, save as reusable cross-platform commands.
- Step-by-step button maker; quickly create buttons and retain their properties; eg optimisationsettings, links and file names.
- Export to Flash options.
- Export to Illustrator options.
- Copy and paste preserving vectors and paths automatically.



~~RRP \$379~~

UPGRADE
\$239

FULL PRODUCT
\$325

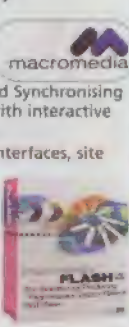
Websearch: MAC133

Websearch: MAC132

Flash 4

Produce High-Impact, Vector-Based Web Sites

- Deliver high-impact Flash sites by mixing and Synchronising MP3 streaming audio with interactive buttons and animation.
- Create distinctive user interfaces, site navigation and other Web applications without programming.
- Produce animated designs more efficiently than before with the optimised Timeline, smart motion guides and outline color mode.



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~~RRP \$579~~

ONLY
\$515

Websearch: MAC120

The J Box MP3 encoder

Be Part of the digital music revolution

The J Box is an MP3 encoder, organizer and player from Greenwich Mean Time.

Oozing with nifty features, The J Box harnesses the latest MP3 technology to give you the ultimate in speedy encoding and playing. Turn your PC into a retro style jukebox - or flick to the miniature pocket player that sits discreetly in the corner of your PC screen - and never hunt for a CD again. All you need is Internet access and The J Box lets you build your personal multimedia music collection right on your PC. Not only can you download the latest music and pre-releases directly from the Net, you can also convert your own CDs to MP3. Once you've built your collection, The J Box intuitively grabs the music you want to play and delivers it to your PC. With its onboard organizer, The J Box allows you to find up to 1000 CDs at a mouse-click. Keep adding to your collection until you've got every song you've ever loved - and delete music when you're tired of it. One of the unique features of The J Box is it's ability to filter your collection based on genre. It features 17 different genres, from classical to reggae, and allows you to filter up to three simultaneously. It's like having your own personal DJ, setting you free to relax - or party - all night. You can even select Random Play and let The J Box automatically pick tracks for you, either from chosen genres or right across your whole collection.

Go Big

Build an enviable music collection right on your own PC. Download MP3s from the Internet and convert your own CDs to high quality MP3 format. Within hours you can easily buildup a multimedia collection of MP3 music. Keep adding to it until you've got every song you've ever loved. And delete them when you're tired of them!

Go Loud

High quality sound. Sometimes you may even forget that you're not playing the actual CD! Select your own conversion rate for high quality or high compression and configure the built-in graphic equalizer to get the sound just right.

Buy in the Box
\$39.95

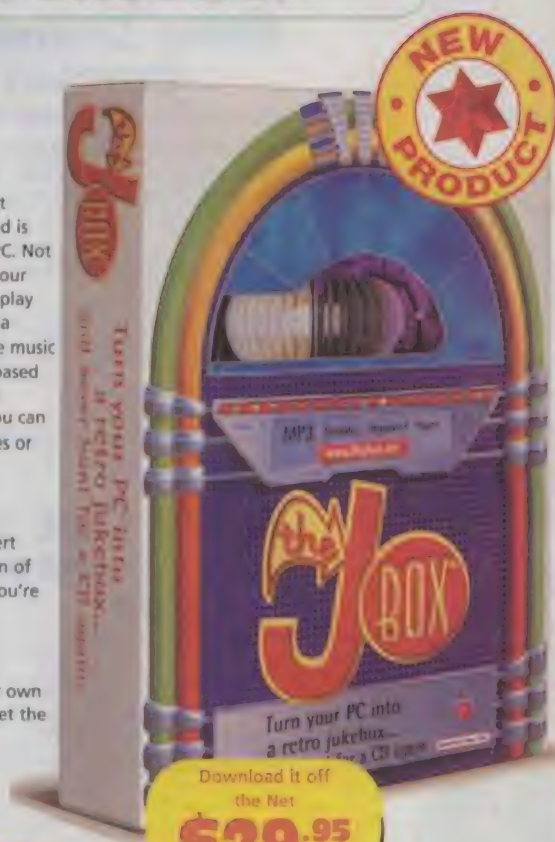
Websearch: GM7001

or

NEW!

Download it off
the Net
\$29.95

www.iswh.com.au/jbox



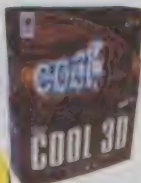
Cool3D

The most easy-to-use 3D titling and animation program on the market. Create 3D titles using text or clipart using cool 3D's drag and drop interface. Add stunning effects and animations from the hundreds of customizable presets within its "easy palettes" simply by dragging it into your text.

Add Stunning
Effects

\$95

Websearch: ULE002



WebRazor Pro

WebRazor Pro comprises 4 complete utilities that make working with web graphics faster, easier and more efficient. Contains SmartSaver Pro, Ulead GIF animator, Ulead Cool3D and Ulead Photo Explorer. Keep track of the creation, animation of images and multimedia files. Perfect for professional web design right down to office and home use.

4 Utilities in
1 box

\$185

Websearch: ULE004



PhotoExpress

The perfect entry to image editing for people who are also new using scanners and digital cameras. Now armed with more features, it is ever easier to create postcards, calendars, T-Shirt prints and more. A selection of over 440 customizable templates gets you started quickly. Create panoramic or 360° views with cool 360. Save the file and E-mail it out or put it onto your web page.

Image Editing
for beginners

\$105

Websearch: ULE003



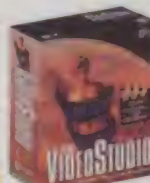
VideoStudio

A new entry level, easy to use video editing software package. Create exciting videos in minutes using VideoStudio's user-friendly drag and drop interface. Choose from storyboard or timeline interface. With over 100 transitions in 12 categories, tiling effects and easy to use features which let you add voice-over narration, sound effects and music.

Easy to use

\$199

Websearch: ULE007



MediaStudio Pro

The best video editing software package around. Includes video capture, video editor, audio editor, video paint and superior title generator modules. MMX enables save in MPEG-1 format as well as FLC, QuickTime, MOV and AVI. Features batch capturing, 105 transitions, supports up to 33 image file formats with in-built vectorscope and waveform monitor.

Video Editing
Made Easy

\$759

Websearch: ULE008



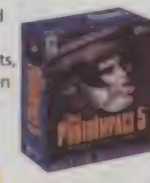
PhotoImpact 5

A set of creative tools that let you create stunning original and web graphics from scratch with multilevel undo to add extra impact to existing images. Save in over 55 different file formats, with hundreds of drag-and-drop effects including stitch, motion blur turnpage, pinch and punch. With this package there is no end to the impact you can add to your web pages.

A must for
web design

\$195

Websearch: ULE001





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We aim to stock at least 95% of ALL the items we sell



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Microsoft Visio 2000 Standard Edition

The fastest, easiest tool for creating professional-looking business diagrams.

It's ideal for creating flowcharts, organisation charts, timelines, and much more. Microsoft Visio 2000 Standard Edition helps consumers communicate clearly so they can better manage people, projects, processes. Standard Edition is ideal for business diagrams such as:

- Flowcharts & Organisational Charts
- Timelines, Calendars, Gantt Charts
- Sales & Marketing Visuals
- Work flow & data flow diagrams
- Directional & geographic maps
- Basic office layouts & network diagrams



Standard
\$325

Websearch: VIS120

Microsoft Visio 2000 Technical Edition

Technical Edition is the leading tool for creating precise 2-D technical diagrams and drawings. Unlike CAD, it's fast and easy to use-just assemble drawings intuitively using more than 4,000 intelligent, industry-specific SmartShapes(r) symbols.

- Precision drawing tools.
- Superior CAD Compatibility
- Powerful industry.
- Customizable drawing platform.
- Enhanced database connectivity.
- More than 4,000 intelligent SmartShapes symbols.
- Enhanced Internet support.



Technical
\$659

Websearch: VIS125

Microsoft Visio 2000 Professional Edition

is the market leader in IT diagramming software, delivering industry-standard tools for rapidly producing network, database, software, and Web diagrams. Microsoft Visio 2000 Professional Edition provides IT professionals with innovative solutions for:

- Network diagramming and design
- Directory Services diagramming
- Detailed database reverse engineering
- Complete UML diagramming
- Reverse engineering from Visual Studio
- Web site mapping
- Advanced data flow diagramming
- Business Diagramming



Professional
\$669

Websearch: VIS127

~~RRP \$710~~

Microsoft Visio 2000 Enterprise Edition

provides powerful design and documentation tools for IT specialists who develop and maintain networks, databases, software applications, and Web sites. Microsoft Visio 2000 Enterprise Edition provides IT specialists with automated solutions for:

- Network design and documentation
- Directory services import and diagramming
- Database design and re-engineering
- Database workgroup collaboration
- Business-rules-based database design
- Complete UML diagramming
- Forward and reverse engineering of code



Enterprise
\$1575

Websearch: VIS128

~~Why pay RRP prices? \$1699~~

iGrafx DESIGNER

iGrafx Designer is the only complete toolset for technical and web graphics, with micron-accurate scale drawing and creative tools, plus imaging graphics for publishing and the Web.

Features & Benefits

- Comprehensive annotation - annotate files with associative dimension lines, angular and radial dimensions, area, volume and perimeter along with call outs.
- Transparent vector effects - make colours, gradients or bitmap and tiled fills transparent or gradually transparent.
- Output interactive iGrafx Designer files as interactive JAVA applets for use with any web browser.
- View, name and manage objects and layers with the object and layer browser
- Line styles for any type of technical illustration or fashion design.



\$575

Websearch: MGF027



iGrafx PROFESSIONAL

Create Professional-Quality Business Diagrams - Your Way!

To make an impact and get your point across you need to communicate ideas, information and data using clear, instantly understandable visuals that give you and your company an edge. Create flowcharts, process maps, network diagrams and organisation charts faster and easier than ever before

Features & Benefits

- Automatic offpage connectors - makes multi-page printed diagrams easier to read. When published as HTML, connectors become hyperlinks
- Web Links - All documents and web pages can be linked.
- Includes iGrafx Business.
- Multiple fonts, interline spacing, paragraphs and bullets within shapes. Create attractive, stylish charts that accurately reflect the information being communicated.
- Import diagrams created with Visio.



\$575

Websearch: MGF025



AutoCAD LT 2000

The only low cost, professional 2D CAD program that's 100% AutoCAD compatible

New AutoCAD LT 2000 is the easiest, most efficient way for you to extend your design team-because it's simple enough for new-to-CAD users, accessible enough for occasional users, and powerful enough for professional-strength drafting. Plus it's the only low-cost, professional 2D CAD program to combine productivity-packed precision and award-winning HTML-based online help with unprecedented ease-of-use and 100 percent AutoCAD 2000 compatibility.

So team members can exchange drawing files with confidence knowing that data integrity and visual fidelity are ensured. And they can take advantage of more than 200 new productivity features including Multiple Design Environment, AutoCAD DesignCenter, and the Object Property Manager.

- Visual and intuitive
- Drawing productivity
- Compatibility and design sharing
- Easy to learn

Upgrade
only
\$275



ONLY
\$759

Websearch: AUT469

**Educational
Pricing Available**

AUT109 AUTOCAD 2000 (STUDENT COPY)
AUT110 AUTOCAD 2000 (FACULTY COPY)

QuickCAD

Faster, Easier, and Most Affordable CAD!

QuickCAD is the faster, easier, most affordable CAD software, whether you're a first-time user or an expert. A three-level interface prompts you to choose your level of experience Beginner, Advanced, or Expert - to easily create any technical drawing. Other features include QuickHatch, AutoArray, Jump Snap, Guidelines, Realtime Pan and Zoom and compatibility with most popular CAD programs. In addition, QuickCAD software's DWF export allows you to publish your drawings on the Web. QuickCAD offers features and performance to allow you to become more productive even faster.



JUST
\$75

Websearch: AUT040

Actrix Business

Better Visuals for Better Communication

Actrix Business is the easy-to-use, value-priced diagramming tool designed for business professionals who need to quickly create dynamic visuals like flowcharts, block diagrams, organization charts, and other business drawings. Get results faster with features like single-click drag-and-drop drawing, automatic snapping and alignment of shapes, and easy navigation using the familiar Microsoft Office interface. Get your point across faster with compelling visuals that can be easily dropped into Microsoft Word or Powerpoint documents, or shared on the Internet in HTML. Actrix Business is part of the Actrix family of Simply Smarter Diagramming tools from Autodesk, the world leader in PC-based design tools.



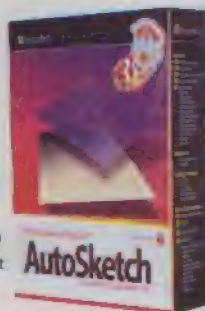
\$179

Websearch: AUT470

AutoSketch 7.0

Spend Time Drawing - Not Learning Software!

An affordable and easy-to-use precision drawing tool for new or occasional CAD users who need to create conceptual drawings and sketches. AutoSketch 7.0 provides productivity and ease of use features not found in other low cost precision drawing programs. Other features include 3-D Effects to add more impact to conceptual drawings, proposals and presentations; customisable grids; in-place OLE editing and the ability to import/export DWG files. Compatible with Microsoft Windows 98, 95 and NT.



\$169

Websearch: QUT032

- Drawing guides
- Automatic snap
- Spell check
- Dynamic pan & zoom
- AutoArray
- Detail view
- Construction lines
- Advanced tools for easier wall placement
- Hyperlinks

Actrix Technical

The Simply Smarter Way to Diagram

Actrix Technical is a 2D diagramming tool that provides a truly automated drawing environment for easily creating a full range of dynamic drawings, from facilities plans to technical schematics to business diagrams.

Easy to Use

Just select the template that suits your task and browse the catalogues you're shown. Then drag and drop the ActiveShapes objects you need into your diagram or drawing. You can even directly manipulate them on-screen.

Superior AutoCAD Interoperability

Actrix Technical can read and write AutoCAD drawings, and it lets you reuse AutoCAD blocks in your diagrams.

Intelligent, Discipline-Specific, ActiveShapes

Drag intelligent ActiveShapes into place and they automatically snap, align, and rotate precisely into position.



\$495

Websearch: AUT056

LT 3D

LT3D is a full 3D modelling plug-in for AutoCAD LT with a range of tools to cater for all types of 3D modelling as well as the power to modify and measure. It includes routines for creating 3D surfaces and solids, and tools for modifying and editing them. In addition there are some routines to make viewing and manipulating your 3D scene much easier.



\$259

Websearch: AUT112

**AutoCad
Plug - In**

* Packaging may differ, image used for illustration purposes only

Smart Architect LT

This architectural drafting application vastly enhances the ability of AutoCAD LT 97 and 98. It caters for all types of building development. The main features consist of walls, windows, doors and roofs, giving the ability to generate 2D drawings and 3D models. Provides tools to cut sections, peel off elevations and automatically dimension the building.



\$879

Websearch: AUT111

New



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Monday to Friday
10.00am 'til 3.00 pm (EST) Saturday



Terms & Conditions

All prices include Sales Tax. Prices subject to change, see page 56 for terms and conditions.



50

Norton SystemWorks 2000 Professional Edition



Norton SystemWorks 2000 Professional Edition combines the world's #1 utility suite with advanced tools for PC experts. Fix and prevent windows problems, find year 2000 bugs, and clone entire systems - all for one great price. Don't take chances with your PC. Keep it working with Norton SystemWorks 2000 Professional Edition. An incredible value, offering five award-winning products, plus advanced utilities, Norton 2000 and Norton Ghost for PC experts. Also included in SystemWorks 2000 Professional Edition is a free Bonus Pack.

Includes Professional Pack:

- Norton 2000
- Norton Ghost

Plus Bonus Pack:

- Zip It (File Extraction & Compression)
- WinFax Basic Edition (PC Faxing)

- Norton Secret Stuff (Internet Email Privacy) Everything you need in one fully integrated suite:
- Norton AntiVirus 2000
- Norton Utilities 2000
- Norton CleanSweep 2000
- Norton CrashGuard 2000
- Norton Web Services

Educational Pricing Available

RRP \$199

AMAZING! ONLY \$149

Websearch: NDR110

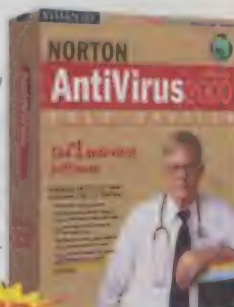
Norton AntiVirus 2000

The #1 Anti-Virus Software in the world

As always, Norton AntiVirus 2000 will run constantly in the background to keep your computer safe from viruses and it can be scheduled to automatically retrieve new antiVirus definitions from Symantec as often as once a week.

Features:

- Graphical Alerts - New! Provides clear, easy-to-understand instructions on how to proceed when a virus is detected.
- Email Scanning - New! Scans incoming email attachments automatically for the most popular email products, preventing viruses from even entering your system.
- Compressed File Detection and Repair - Improved! Eliminates viruses hidden in multiple compressed layers automatically.
- Ease-of-Use - Improved! Provides increased integration with Norton SystemWorks.



RRP \$99

\$75

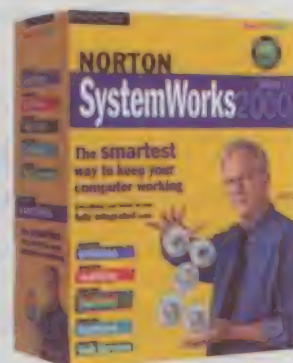
Websearch: NDR113

Norton Systemworks 2000 Standard Edition

Norton SystemWorks 2000 for Windows 98/95 is the only fully-integrated and market-leading utility suite designed to protect your computer from viruses and crashes, solve problems, remove un-needed files, and update your applications.

Includes:

- Norton AntiVirus 2000
- Norton Utilities 2000
- Norton CleanSweep 2000
- Norton CrashGuard 2000
- Norton Web Services

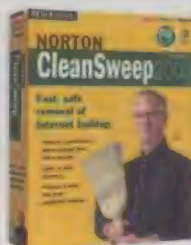


ONLY \$125

Websearch: NDR110

Norton CleanSweep 2000

Improve your PC's performance by easily removing un-needed programs and files. Provides automatic protection against accidental file deletion no other clean up product is as safe.



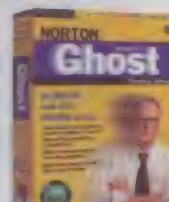
RRP \$60

\$59

Websearch: NDR114

Norton Ghost Personal Edition

A powerful disk drive cloning and imaging utility that speeds up and simplifies PC system migration, hardware upgrades, hard disk backups and disaster recovery operations.



RRP \$149

\$115

Websearch: NDR115

Norton Utilities 2000

Norton Utilities 2000 is the market leading solution for fixing, maintaining and optimising PC's.



RRP \$99

\$75

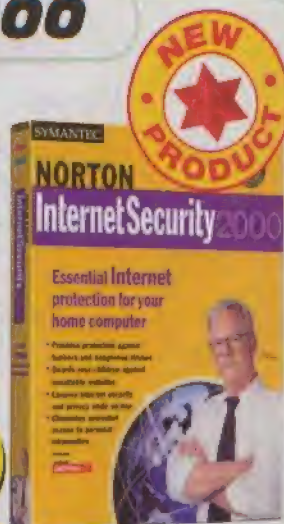
Websearch: NDR112

Norton Internet Security 2000

Includes A full version of Norton Antivirus 2000

Norton Internet Security 2000 provides essential Internet protection for your home PC. If you spend a lot of time online-especially if you have a cable modem or DSL line-you need a strong defense against Internet threats. Norton Internet Security 2000 stops all sorts of viruses, malicious Java applets and ActiveX controls, and even hackers-before they can access your valuable data. If you encounter an unknown virus, just send it to the experts at the Symantec AntiVirus Research Center (SARC) and they'll get back to you promptly with a cure. With Norton Internet Security 2000 you also get powerful tools to safeguard confidential information on your PC from unwanted visitors. Use them to protect credit-card numbers, bank-account information, and other personal data. Worried about what your children might

find on the Internet? Norton Internet Security 2000 helps you restrict their access to specified Web sites, newsgroups, and other areas of the Internet. It also lets you prevent them from submitting personal information through Web forms without your approval. You can even block annoying banner ads, pop-up windows and other Web page clutter. Norton Internet Security 2000: Essential Internet protection for home computers!



***30% Rebate for existing Symantec Norton Antivirus or SystemWorks customers (Any version applies)**
"Rebate coupons are supplied in the box"
• While stocks last

30% OFF!

ONLY \$89

Websearch: NOR138

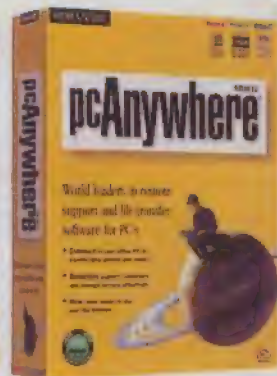
pcAnywhere 9.2

NEW!

The #1 seller for fast, easy access to any PC

If you need to work from home or on the road, pcAnywhere lets you connect to your office PC to transfer files quickly and easily. Its special optimised design ensures the best possible performance at any connection speed. You can also run applications that reside on your office PC or a corporate server - a great feature for software that's too large to keep on your laptop or that can't be installed on external computers for security reasons. pcAnywhere supports a wide range of connection methods - including standard modems, ISDN lines, TCP/IP and IPX/SPX networks, direct cable, and infrared connection-so wherever you are, you're sure to find one that meets your needs. And now, it's even easier to use over the Internet. If you're an IT professional, pcAnywhere lets you remotely support users and manage servers effectively. Monitor and control

remote laptop and desktop systems to troubleshoot problems. Deliver training materials and pre-configured software updates to multiple users. Manage LANs, WANs, and even enterprise-wide information systems.



Windows 2000 Compliant

~~RRP \$269~~

JUST \$199

Websearch: SYM232

TalkWorks PRO 3.0

Give Your Small Business a Professional Voice

TalkWorks PRO from Symantec brings professional voicemail and fax messaging to home offices and very small businesses. Its integrated capabilities keep you in touch with your customers 24 hours a day. With TalkWorks Pro 3.0

Includes WinFax Pro 9.0

- Enjoy the full functionality of WinFaxPRO.
- Get notification when a voicemail or fax message arrives.
- Create reports of incoming and outgoing calls.
- Save money by sharing a single voice modem and phone line across your entire business.
- Offer fax on demand to provide your customers with information any time of the day or night.
- Set up separate mailboxes for employees and fax on demand.



All these powerful features are accessible through an easy-to-use interface. There's even a mailbox setup wizard to get you up and running quickly. So if you need voicemail, message notification, call tracking, or fax on demand, give your small business a professional voice with TalkWorks PRO.

Voicemail and Faxing all in one

~~RRP \$199~~

GREAT VALUE \$155

Websearch: SYM224

WinFax Pro 10.0

The world's #1 choice for hassle-free faxing!

WinFax PRO 10.0 software takes Symantec's industry-leading fax solution to new levels of flexibility, reliability, and ease of use. With WinFax PRO 10.0 is the #1 choice for sending, receiving and managing faxes.* Its high-quality faxes help you project a professional image to your clients and customers. It's easy to set up, learn, and use. It also integrates with your key business applications to simplify management of client and customer interactions. Version 10.0 lets you send and forward faxes via email. When image clarity is vital, you also have the option of sending photo-quality faxes. For simplified project management, you can store incoming and outgoing faxes in the folders of your choice



World's Number 1!

Educational Pricing Available

\$125

Websearch: SYM210



MCAfee

VirusScan 5.0

Price

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We will not be
beaten on price!
We cut prices not
corners.
see Terms & Conditions



Free Gift

Make sure to ask
for your free gift
when ordering.



Fast

Delivery

Full range of
delivery options:
• Same day,
Sydney*
• Next day*
• International*

Massive
Range

We aim to stock at
least 95% of ALL
the items we sell

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Shop

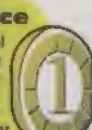
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see page 56 for
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Windows 95/98

CD-ROM

Analyzes Microsoft Word and Excel macros, seeks and destroys unidentified macro viruses and repairs files automatically!

Surf the Net Protected!

VirusScan 5.0 protects you from destructive ActiveX and Java applets often downloaded without your knowledge while you're browsing.

Attack Infected Email

The VirusScan software's advanced e-mail X-Ray feature catches viruses in Internet mail even before new messages have been opened. Viruses never reach your system! Works with cc:Mail, Eudora, Microsoft Exchange and Outlook. Quarantine infected and suspicious files. Suspicious file could be sent to McAfee AVERT Labs for testing and personalized diagnosis.

Easy to Install and Operate

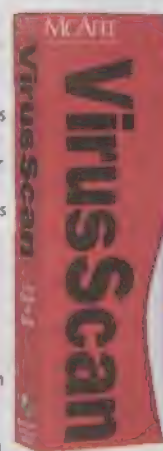
The Configuration Assistant helps you set the virus protection that best suits your needs based on your answers to a few simple questions. VirusScan software provides incremental updating allowing users to quickly and easily update their virus protection.

Protects Your Data

Keeping your data files safe and sound with a virus free backup is just another security benefit! By creating a back-up of the most recent version of your documents in a protected area of your hard drive, you can easily recover your files even if your original copy becomes corrupted due to a virus or system issue.

24-Hour Worldwide Watch

VirusScan software is backed by McAfee AVERT Labs (Anti-virus Emergency Response Team), the world's largest anti-virus research group 24 hours a day this elite team of researchers, based in eight locations around the world, works to find the latest virus threats and distribute their cures.



15 Million Users
Protects
More Than
100 Million Files
Per Day



#1 Virus Detection and Removal

\$59

Websearch: MCA162

NEW!

Viruscan 5.0 deluxe

MCAfee McAfee Utilities

Prevent PC Crashes- McAfee Utilities provide full PC crash protection, recovery and prevention.

Repairs Hard Drive- McAfee Utilities monitors your system and uses the enhanced PC check up feature to diagnosis and fix problems with Microsoft Windows, hardware and software.

Optimizes System Performances- McAfee Utilities provides tools to defragment your hard drive, clean junk off your system and optimizes your registry for system wide performance boost.

Protects your Data- McAfee Utilities keeps your data safe and sound.

Recovers from disasters- McAfee Utilities provides emergency rescue capabilities as well as the new universal undo feature, allowing you to do undo general system changes.



\$45

Websearch: MCA162

MCAfee

McAfee

Internet Guard Dog V3

For Windows 95/98

- Allows Children to Surf & Chat Safely Parents can customize Internet Guard Dog technology by adding words or web sites you don't deem appropriate, setting online time limits, blocking email and ads or by preventing Internet access all together.
- Safeguards Private Information Prevents personal information from being transmitted without your permission. Personalize your data by encrypting files with passwords.
- Eradicates Viruses The VirusScan technology detects and removes all types of viruses from any source.



\$69

Websearch: MCA162

MCAfee Office 2000

One Solution for Every PC Problem!

Now, you can protect, repair, secure, and optimise your PC with one integrated software package. McAfee Office is an assembly of award-winning, PC diagnostics and utilities tools that is the single solution for every PC problem:

Contains:

- VirusScan v4.02
- First Aid 2000 v6.02
- Nuts & Bolts v2.03
- Y2K Survival Kit v1.0
- Oil Change v2.5
- Uninstaller v5.12



\$129

Websearch: MCA162

McAfee Firewall

Key Features:

- Simple, One-time Setup
- Total Protection
- Easily Configured
- Full Stealth Mode
- Application and Link Layer Protection
- Secure Mobile Connectivity
- Comprehensive Compatibility: Works with all dial-up connections, most cable, DSL and ISDN modems as well as most Ethernet cards.
- Enhanced DSL Support: McAfee.com Personal Firewall supports PPP over Ethernet™, which is frequently employed by DSL Internet Service Providers.



Designed for the home user
Protects against hackers
Intuitive to installation
Easy to control

Stop Hackers Cold

\$45

Websearch: MCA162

PartitionMagic 5.0



Now the top-selling utility, that allows you to reclaim up to 40% of your hard disk & organise your hard drive, has got even better! PartitionMagic 5.0's new features makes it easy to eliminate inefficient storage methods that can cost you hundreds of megabytes of lost disk space.

New Features:

Merge Partitions - Users now have the ability to merge FAT and FAT32 partitions. This eliminates the need for copying your data to a separate partition prior to creating, moving, or resizing another partition. Merging partitions also eliminates time and steps because it speeds up the process of organising your data.

Partition Conversions - Users can now convert NTFS to FAT and FAT32, which adds more flexibility in converting partitions, along with the ability to convert primary partitions to logical partitions or vice versa. Additionally, users can now regain a primary partition to install a new OS, or change the manufacturer primary and logical partition settings on new computers.

Enhancements to both the interface and wizards, based on valuable customer feedback,

Improved on-line help and error checking in partition tables - Provides users with the ability to go into their partition tables and fix or change errors. PartitionMagic 5.0 will now prompt users during startup with any problems in the partition table.

Includes:

- Addition of a new merge partition wizard.
- Option to hide wizards.
- Colour-coded file system types with a colour key legend.
- Instruction wizards which provide only task-oriented options.
- Combined "Prepare for new OS" wizard and a "Create New Partition" wizard into a new single wizard called, "Create New Partition" wizard. This wizard now assists users who are installing a new OS with specific options that helps them create a partition specific to that OS.

Ability to view a list of pending operations - Provides users with the flexibility to review the steps that will be processed before applying the changes.



Multi User Licenses Available

BEST SELLING
\$109

UPGRADE
\$49

Websearch: POW041

Websearch: POW041

Lost & Found

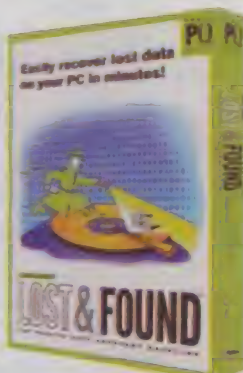
Restoring lost data is just a few keystrokes away

Rather than spending thousands of dollars to send your hard drive to a data recovery centre, Lost & Found lets you automatically recover and restore data after accidental (or even intentional) data loss, or from corrupted media caused by a disk crash or logical system failure.

What makes Lost & Found an easier, more effective data recovery system?

Unlike other data repair and recovery software solutions, Lost & Found:

- Does not need to be installed prior to the recovery of lost or corrupted files.
- Does not alter, write to or attempt to repair critical sectors on the damaged disk, increasing the chances of a successful data recovery.
- Recovers your files even after reformatting, as long as you have not written over them.
- Performs a disk analysis and reports the odds of recovery via colour coding. Allows you to save data to a network drive.



JUST
\$99

Websearch: POW041

Second Chance 2.0

Wouldn't you like one?

Have you ever changed a system setting and found that it hindered your computer's performance? Or downloaded a file that caused problems for your system? Perhaps you have unsuccessfully tried to get rid of a program that partially installed. Or maybe you're not sure what happened, but your computer just is not working as well today as it worked yesterday. SecondChance acts as a first line of defense against system errors by periodically taking "snapshots" of the system. That way, it's possible to return to when the system worked properly and easily undo harmful or unwanted changes with a click of the button. And getting another chance is what SecondChance is all about. Don't take chances with your sanity - get SecondChance.



JUST
\$109

Websearch: POW041

Drive Image 2.0

The complete imaging solution for hard drive backups, upgrades and data recovery

Drive Image lets you easily create a compressed image file of an individual partition or an entire hard drive. This file can be stored on a network, JAZ, ZIP, CD-ROM or tape drive and then downloaded, to make quick work of backups, data recovery or upgrading to a new, larger capacity hard drive. With Drive Image, image files can be downloaded to drives of the same size or resized to fit drives of a different size and geometry for maximum flexibility.



ONLY
\$99

Websearch: CHK007

Drive Image Pro 3.0

If it's not Drive Image - it's not an Exact Image!

Drive Image Pro 3.0 is a hard-disk imaging solution for IS professionals, service providers, and configuration centres.



Minimum 10 Users
\$45

Websearch: CHK025

DriveCopy 2.0

The safest, easiest, and most affordable way to copy everything from your old hard drive to your new hard drive

There was a time when upgrading to a new hard drive meant hours of downloading your data, applications, and operating systems to disk; then hours more of reinstalling everything to your new hard drive. If it all went well, you could be looking at a few days worth of work. Of course, there was always the risk of scrambling your data or losing it altogether in the process. Fortunately, now there's DriveCopy from PowerQuest. With a few simple steps, everything from your old hard drive is automatically copied to your new one without losing a single preference, setting, or byte of data. With DriveCopy you can now run your operating system, applications and data on a new, larger and faster hard drive. So go ahead - update your dinosaur with a new high-capacity hard drive. With DriveCopy, it's never been easier or more affordable.



ONLY
\$45

Websearch: CHK007



Price Pledge

We will not be beaten on price!

We cut prices not corners.

see Terms & Conditions



Free Gift

Make sure to ask for your free gift when ordering.



Fast Delivery

Full range of delivery options:

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Massive Range

We aim to stock at least 95% of ALL the items we sell



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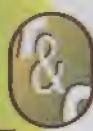
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10.00am 'til 3.00 pm
(EST) Saturday



Terms & Conditions

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Fix-It Utilities 2000

New version from the makers of ZipMagic and PowerDesk comes a brilliant new version of their award winning Fix-It Utilities. Just what you need to fix problems or simply tune up your PC to get top performance? Fix-It is the only problem-solver designed right from the start to work on Windows 95, 98 and NT! It includes a disk fixer that is faster than ScanDisk for Windows, a powerful disk defragmenter, hardware diagnostics, crash protection, Windows Registry cleaning and optimization, deleted file recovery, virus protection, disk cleaning, disk verification, a Windows customization tool and more.

Fix-It Utilities includes:

- Crash Protection.
- Disk Fixer.
- Disk Defragmentation.
- Smart Drive Optimising.
- Clean & Optimise the Registry.
- Hardware Diagnostics.
- Bring Back trashed files.
- Virus Protection.
- Year 2000 tools.
- Win 95, 98, 2000 & NT.
- Emergency Disk compatibility.
- PowerDesk, valued at \$59.95 Bundled FREE.
- Customise Windows.
- 1 year free Internet Technical and UpdateSupport.
- Crisis Center for Data Recovery.



RRP \$89

ONLY \$85

Websearch: MU002

VET Premium Anti-Virus

Virus Protection For All Platforms Essential Protection

Virus protection has never been as essential as it is today. New viruses are continuing to appear at an ever-increasing rate and new types of viruses - for instance Word macro viruses - regularly take the PC World by surprise. The Internet, intranets, networks, Email, shared disks and shared PCs all enable viruses to spread. Vet Anti-Virus Software provides you with the protection you need for your system, whether it is a stand-alone PC or a complex network of PCs in an organisation. This combines all the advantages of Vet Net Surfer with the additional benefit of mailed quarterly upgrades - delivered to your home or office. The choice is yours - Vet Net Surfer with on-line upgrades, or Vet Premium with on-line and mailed upgrades. Both offer complete virus protection for you PC.

- Unlimited phone and email support.
- Unlimited access to upgrades on-line.
- Upgrades mailed quarterly direct to you.



VET PREMIUM \$89

Vet Net Surfer (updates via Internet only) \$75

Websearch: VET001

Websearch: VET006

CuteFTP V3

For Uploading Web Pages ...Fast!

CuteFTP is a Windows-based File Transfer Protocol (FTP) client that allows users to utilise the capabilities of FTP without having to know all the details of the protocol itself. This excellent FTP program has a lot more than just a pretty interface.

Key Features:

- Drag and drop interface.
- Fast upload and download.
- Resume upload and download.
- Remote file editing.
- Queue transferring.
- Bookmarks remot directories.
- Clipboard monitoring of FTP links.
- Force upper/lower/preserve file case.
- Keep alive "Noop" command.
- Integrated HTML editor.
- Powerful macros that work.
- Directory compare for website maintenance.
- CuteFTP has an excellent array of features, including caching, stop command and cool interface. It is a must have upgrade.
- CuteFTP version 2.0 is specially designed to take advantage of the NT and Windows 98 operating systems.



Designed for Microsoft Windows NT Windows 95

RRP \$89

JUST \$79

Websearch: GB5001

WinZip 7.0

The Ultimate Companion for Internet Downloading

WinZip brings you the convenience of Windows to the use of ZIP files without requiring PKZIP and PKUNZIP. It features an intuitive point-and-click drag-and-drop interface for viewing, running, extracting, adding, deleting, and testing files ZIP, LZH, ARJ, and ARC files.

The Zip Advantage:

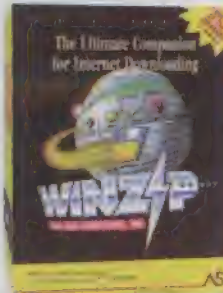
Zippping safely compresses the data in your files, so that your files occupy less space. This allows you to save more time by speeding up file transfers. "Zippping" reduces the size of files, while "Unzippping" restores the files to their original form, completely unchanged.

Internet Surfers:

WinZip makes it easy for you to access almost all of the compressed files you download from the Internet. WinZip features built-in support for Zip, TAR, gzip, Unix Compress, UUENCODE, BinHex, and MIME files.

Key Features

- Tight integration with the Windows 95/98/NT shell.
- Drag & Drop to or from the explorer, or ZIP & UNZIP without leaving the Explorer.
- Drop files on a printer to print.
- With the easy to use tool bar you have the convenience of Windows when Zippping.
- Built-in PKZIP-compatible ZIP and UNZIP (PKZIP and PKUNZIP are not required)
- Built-in support for the popular Internet file format TAR, gzip, Unix compress, Uuencode, Xxencode, Hinx, and MIME.
- Simplify file distribution by making files that unzip themselves.
- Optional WinZip Wizard Interface.
- Works with ARJ, ARC, and LZH files.
- Optional virus scanning support.
- Supports Windows 3.1, 95, 98 and NT.
- 32 and 16 Bit versions included.



BEST PRODUCTS BEST PRICES

PKZIP 2.5 \$49

WIN ZIP 7.0 \$59

Websearch: WIN105

Websearch: WIN119

OmniPage Pro 10 Upgrade

What's New in OmniPage Pro 10?

New OCR Engine - combines the OCR technologies from three award-winning OCR applications: OmniPage Pro, WordScan Plus and Recognita Plus. It's like having three pairs of eyes checking each page at once to dramatically improve accuracy. The result? Less editing. Less proofing. Less work. It's accuracy you really have to see to believe. Also, OmniPage Pro 10 incorporates additional dictionaries that increase accuracy recognition, especially on compound and non-English words. As a result, the program provides the highest level of OCR accuracy and reduces the number of errors by 30%, on average, over the previous version.

Voice Read-Back

Reads OCR results back to users out loud.

OmniPage Web Personal Edition included

Caere's pioneering Web publishing software that converts multi-page documents to well-designed, fully hyper-linked Web sites.

New Simplified User Interface

A streamlined user interface makes the OCR process more intuitive and straightforward by providing a new tabbed toolbox, which allow users to select from three process modes: AutoOCR, Manual or OCR Wizard, each with their own toolbars.

Improved Font Rendering

New Font Matching scheme takes into account font metrics such as character aspect ratio, as well as the look of characters and the spacing of text lines.

Improved De-skew Technology

Minimises distortion of the document image which often occurs during the page straightening process, thereby improving OCR accuracy. This is particularly helpful for users with sheet-fed scanners and those using automatic document feeders.

New Caere Scan Troubleshooter

Assists users in resolving common scanning problems.

Improved OCR Proofreader

Now includes five levels of zoom that enable users to see as much of the original document as necessary to proof OCR results.

Auto-launch of Native Applications

Users can automatically launch the applications to which their documents are being exported, including Microsoft Word and Excel.

Microsoft Windows 2000 Certified

OmniPage Pro 10 is among the first software applications to meet Microsoft's requirements for Windows 2000 certification.



Websearch: OMN120

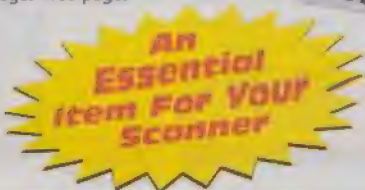
PageKeeper Pro 3.0

The Best Document Manager

PageKeeper Pro 3.0 is the only document manager to fully automate the time-consuming tasks of organizing and maintaining all your documents. Need a document fast? PageKeeper Pro works like a search engine and instantly finds all documents that meet your criteria.

Features:

- Automatically files documents with Smart Folders
- Automatically keeps track of edits
- Instantly finds any document
- Supports any file format
- Manages Web pages



Websearch: OMN116

OmniPage Pro Scanner Suite Upgrade

Everything you need for your scanner



Includes

- OmniPage Pro 9
- PageKeeper Pro 3.0
- Adobe PhotoDeluxe Business Edition
- Post-it Software Notes
- More Accurate OCR
- Over 99% accurate*
- Ability to maintain layout of original page
- Superior integration with Microsoft Word
- Automatic File & Find
- Automatic document organisation with Smart Folder
- Automatic document importing with Folder Watch

Better Image Editing

- Hundreds of business templates for Web banners, direct mail and more
- Ability to print to Avery paper for labels, business cards and more

The Top Annotation Software

- You can add notes to scanned images, other documents and even put them on the desktop

* On laser quality documents using standard fonts

Incredible Value



Websearch: OMN117

OmniForm 4.0

Electronic Forms the Easy Way - Instantly!

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- Design photo masterpieces with 3D effects, special effects and more
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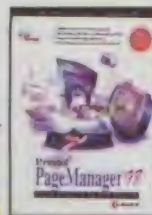
Presto! PageManager 98 features

- Scan Direct lets you scan without loading your scanner driver for faster scanning
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- Supports over 100 popular applications
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- Full-text search with adjustable Fuzzy logic and index search capabilities
- QuickFix image editing tools with real-time preview
- Annotation tools include text sticky notes, rubber, highlighter and more

- Presto! Wrapper - the easiest way to share photos via e-mail
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- Support true 36-bit colour scanning
- Optimised for Intel MMX and Pentium II

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Presto! OCR 4.0

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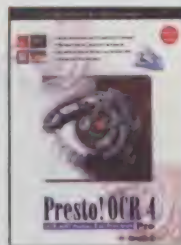
Presto! OCR Pro Features:

- Fontain Image Transformation technology ensures the most accurate OCR
- Scan & Read button lets you scan and OCR black-and-white or grayscale images in one step
- Scanning and OCR tips, hints and made-easy functions make OCR foolproof
- Multilingual recognition — recognises English, French, German, and mixed languages
- Accurately reads laser print, dot matrix, typewritten, fax, photocopy, and poor-quality documents
- Batch-scan OCR documents and organize them on multiple workstations.
- Built-in spell-checker and dictionaries for English, French, and German languages
- Text verifier lets you proof-read by comparing the recognized text with the original image and by highlighting suspicious words

- Single and multi-column documents with text, photos, graphics, and tables
- Learning engine lets you recognize unique characters, fonts, symbols, and languages.
- Maintains links with the original image during editing for accurate editing
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- Saves recognition results in CSV, DBF, HTML, RTF, TXT, and XLS file formats
- Supports TWAIN compliant scanners

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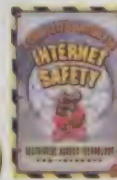
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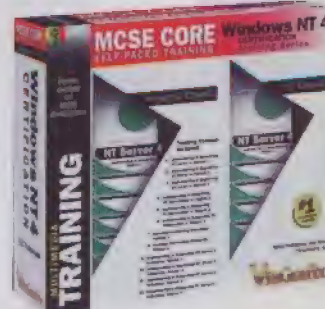
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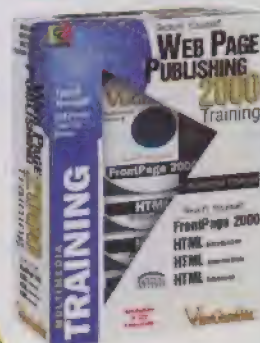
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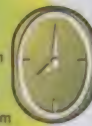
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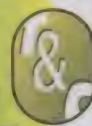
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Time DIRECT



Issue 4 Volume 1 May 2000

Compaq Armada V300

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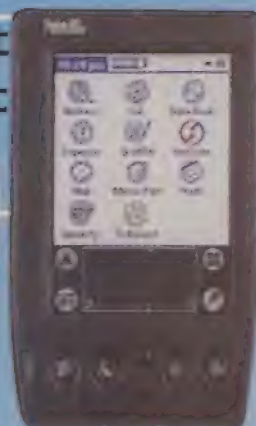


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As notebooks are increasing in demand, so to are their capabilities. Inside you will find state of the art notebooks and accessories at state of the art prices. See the business persons newest (and mandatory) toy - the Palm Pilot V at a smashing \$745 to the IBM Thinkpad I Series 1700 which we are letting go at \$4,955 - well below RRP.

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- 56k PCMCIA modem
- Win 98
- 1 year Warranty



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- 14.1" TFT screen
- 8Mb graphics card
- 2x DVD drive
- 56k PCMCIA modem
- Win 98
- 1 year Warranty



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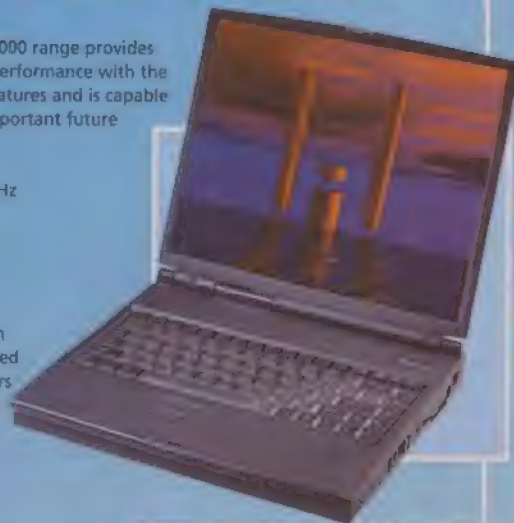


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- Reliability is improved by a massive 3+hours of battery life



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Toshiba Satellite 4090xCDT

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- Intel Celeron 400MHz
- 64Mb SDRAM
- 6Gb Hard Drive
- 14.1" TFT Screen
- 24x CD ROM
- 56k modem
- Floppy drive
- Win 98
- Stereo speakers
- 2.5 hour battery life



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Toshiba Satellite 2180CDT

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- 64Mb RAM
- 4Gb Hard Drive
- 12.1" TFT screen
- 24x CD ROM drive
- 56k modem
- Win 98
- 1 year Warranty



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Websearch: TOSH53

Notebook	Processor	RAM	Hard Drive	Screen	CD ROM	Modem	OS	Code	Price
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PORTEGE 3110CT	PIII PE 300	64	6Gb	10.4" TFT	Optional	56k	Win 98	TOSH36	\$3799
SATELLITE 4090XCDT	Celeron 400	64	6Gb	14.1" TFT	24x	56k	Win 98	TOSH39	\$4199
SATELLITE 2650XDVD	Celeron 466	64	6Gb	14.1" TFT	4xDVD/20xCD	56k	Win 98	TOSH55	\$4499
TECRA 8000	Celeron 400	64	6Gb	14.1" TFT	24x	56k	Win 98	TOSH43	\$5499
SATELLITE 4280XDVD	PIII 500	64	6Gb	14.1" TFT	6xDVD/24xCD	56k	Win 98	TOSH56	\$5699
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TECRA 8100	PIII 400	64	6Gb	14.1" TFT	24x	56k	Win 98	TOSH38	\$5699
PORTEGE 7140CT	PIII 500	64	6Gb	13.3" TFT	Optional	56k	Win 98	TOSH57	\$6499
TECRA 8050	PIII 400	64	6Gb	14.1" TFT	24x	56k	Win NT4	TOSH45	\$6499
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TECRA 8100	PIII 500	64	14Gb	14.1" TFT	24x	56k	Win 98	TOSH48	\$7399
TECRA 8000	PIII 500	64	14Gb	14.1" TFT	24x	56k	Win NT4	TOSH49	\$7599
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- 12.1" screen
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- 56k modem
- Win 98
- 4Mb graphics card



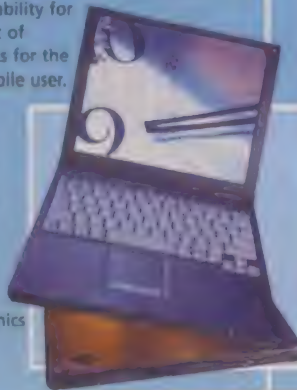
Websearch: COMP56

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Compaq Armada M300

This power-packed ultra-portable offers exceptional mobility and expandability for its size, with a full set of on-board system ports for the most demanding mobile user.

- Intel PII 333MHz
- 64Mb RAM
- 6.4Gb Hard Drive
- 11.3" screen
- 56k modem
- Network Card
- Win NT 4
- 6.4 Bit video graphics



Websearch: COMP57

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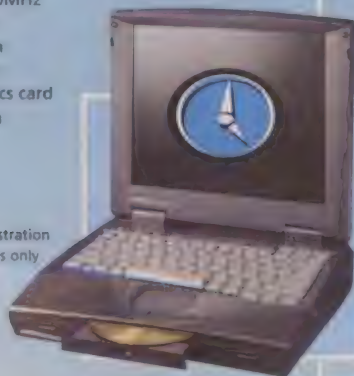
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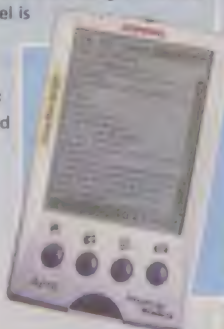
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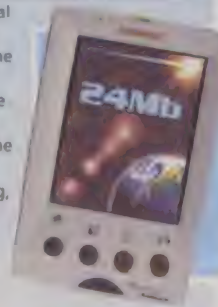
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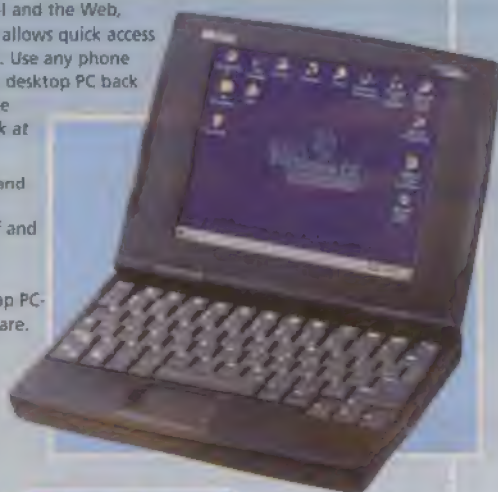
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Palm III Cradle	USR058	\$34

Palm V Cradle	USR110	\$119
Palm III Slim Leather Case	USR108	\$49
Palm V Leather Belt Clip Case	USR111	\$49
Palm V Modem	USR112	\$25
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Classics Battlezone and Army Men are back, alongside some brand new ideas.

What a blast!

Battlezone II

Older gamers will remember the original Battlezone, a wire-frame tank arcade game that was released almost 20 years ago. It was the first real time 3D game ever made and became one of the most popular arcade games of all time.

Two years ago, Activision released an all-new, 3D-enhanced version of the game. Although it wasn't a big seller, many loyal fans have been eagerly awaiting the sequel.

Activision's Battlezone was the first game to allow players to mount a Command and Conquer-style campaign from the comfort of a hovering tank. A brilliant command system allowed players to continually pilot around in the first-person view while still easily building bases, managing resources and commanding forces.

Battlezone II has the same powerful interface, but it has been improved to take into account the advanced network play options — and this is where Battlezone II

under the upgrade laser, and it has the most impressive graphics ever seen in an FPS, with the exception of Quake III. The downside of this is that you need excessive hardware to really enjoy Battlezone II. While the previous version of Battlezone ran smoothly on average machines of its day, the performance of Battlezone II is just OK on a high-end Pentium III, GeForce-based system running at 1,024 by 768 resolution in 16-bit colour.

If you want beautifully rendered graphics, well-defined gameplay and hours of multiplayer mayhem, Battlezone II is it. **Ashton Mills**

Contact	Activision
Phone	(02) 9869 0955
Online	http://www.pandemicstudios.com/
Price	\$49.95
Requires	Pentium II 300, Windows 95, 64M RAM, 3D accelerator
Classification	G
Rating	★★★★



one of the good ones. You play the role of Rayman, trying to escape from imprisonment by pirates and wreak bloody vengeance, or at least fire your magical fists at enemies while you jump around, hanging off cliffs and meeting cute but bizarre 3D-world inhabitants. Of all the strange Rayman-world inhabitants, the teensies are the best — a race of dwarves who share their kingship by the simple expedient of stealing the crown from one another.

Rayman 2 manages the rare trick of being cute without being sickeningly cute, so younger children as well as adults will enjoy it. Controls are the usual fare; you can run around, adjust the camera angles and fire your magic fist to destroy enemies and hook onto objects. There's a variety of platform styles on display, from the 'running around on a fast-moving object for the whole level' to the 'avoiding the killer thingummyjig' level. These are generic, but are presented well enough to still be good fun. It's a fairly long game to work



shines. The game extends multiplayer gaming by allowing players to form teams of commander and pilots; one player is Battlezone commander, building a base and fighting at will, while the other players spend their time scouting, attacking and defending. It's a fantastic combination that allows people to work together in a way not seen before in games of this genre.

Battlezone II's graphics also went



Rayman 2

PC games don't have to be about beer, bosoms and bloody vengeance. They can just be about muppets, flying hands and bloody vengeance instead. That's basically the plot for Rayman 2 — well, except for the bloody part of the vengeance.

3D platform adventures are a dime a dozen on console systems, but they're a touch rarer on the PC, and Rayman 2 is

Guide to ratings

★	Don't cross the street for it
★★	Might be fun on a rainy day
★★★	Fun in any weather
★★★★	Sleep out to buy it
★★★★★	Worth selling Granny for

through, but with unlimited lives and a save at the end of every level, you're unlikely to get badly stuck.

Rayman is cute fun, and that's about it. For a PC game, Rayman is a little light on bloody vengeance (it's more like comical vengeance) but we'll forgive it — just this once.

Alex Kidman

Contact	Ubi Soft
Phone	(02) 9362 1414
Online	http://www.rayman2.com/
Price	\$59.95
Requires	Pentium 133, Windows 95, 32M RAM
Classification	G
Rating	★★★★

Army Men: Toys in Space

The introductory sequence of Army Men: Toys In Space brings fond memories of epic backyard battles flooding back. The time for revenge has come for those who built up great armies of green toy soldiers only to see them destroyed by the insidious tan army. In this, the third instalment in the Army Men series, hordes of alien toys have invaded Earth, and it is



up to Sarge and his green troops to save the world.

Controlling the action from the overhead perspective, your soldiers can be moved using either the mouse or keyboard. Victory requires proper use of Sarge's arsenal of machine guns, sniper rifles, mortars, and unconventional weapons like a fly swat and insect repellent. Such an array of weaponry is needed as the action takes place in settings that range from kitchen tables, picnic rugs and bathrooms to an alien planet.

The graphics and dialogue add to the humour of the game and make Army Men an enjoyable gaming experience, but it could be much better. The graphics are sketchy in parts, some areas are pixelated and various objects frequently



obstruct your view. The controls also need improving; precise movement is all but impossible because of the oversensitive response to the keyboard.

The intelligence of both enemy soldiers and your own men is also questionable. Soldiers often become stuck or just run around aimlessly.

Despite its shortcomings, the blend of humour and originality means Army Men is still a success. Nothing is more amusing than controlling the chaos of toy soldiers fighting — melted plastic and all.

Alan Crawford

Contact	Jack of All Games
Phone	(02) 9482 3455

Games News

- It has to be one of the worst-kept secrets in the gaming world. Microsoft has announced that, yes, it is indeed working on a console system, codenamed 'X-Box'. Bill Gates chose the Game Developers Conference in San Jose to make an official announcement about the new system. Microsoft said it won't be ready until mid-2001, but as the system is based around a Wintel specification, this should probably be taken with a grain of salt. The Christmas sales rush this year would be an obvious time to release it. Anyway, it looks as though it might dent the profit margins of Sony, Sega and Nintendo, as it will be equipped with a customised Pentium III processor, 64M of DRAM, an 8G hard drive, a DVD drive and a customised nVidia graphics chip (based on the NV-25) — all based around the Windows 2000 kernel. There's no word on the price, but Microsoft games manager Ed Fries said that it will be "competitive".
- Remember Diablo? Blizzard has been working on the highly anticipated sequel (Diablo II) for a good two-and-a-half years now, but there is no release

Online	http://www.3do.com/products/pc/armymen3/
Price	\$59.95
Requires	Pentium 133, Windows 95, 32M RAM
Classification	G(8+)
Rating	★★★

Le Mans 24 Hours

There are two types of driving games. There are the hard-core racing sims with ruthlessly accurate physics models and an infinite array of car setup options. Then there are the arcade racers with rudimentary handling but sumptuous graphics and an emphasis on flat-out speed.



date in sight. With the exit of three highly respected players from Blizzard, we may need to wait a little longer. Blizzard PR people are quick to point out that Diablo II is "almost finished anyway", but the departures may affect how soon 'almost finished' becomes 'finished and ready'.

- The last story for this month isn't strictly PC-related. Well, to be honest, it has nothing whatsoever to do with PCs, but it is pretty funny. Nintendo's Mario Party game for the N64 is a health hazard — it's official. The problem is that in a number of subgames of Mario Party, players are required to rotate the mini-joystick on the control pad as quickly as possible. Using the palms for fastest revolutions causes cuts, burns, blisters, punctures and lacerations. This prompted a US attorney-general's investigation, which resulted in Nintendo eventually offering four free protective gloves to anyone who has the game — at a potential total cost to the company of about \$US80 million.

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When a game tries to combine elements of both, the results can be awkward. *Le Mans 24 Hours* is based on the legendary endurance race; 24 hours around the famous Circuit International de la Sarthe. Once you specify the period for which you want to race, the race length and periods of night and day are adjusted accordingly.

Considered as an arcade game, *Le Mans* is reasonably successful. The graphics and sound are good, and there are a handful of tracks in addition to Sarthe on which to have fun. There are two alternatives to *Le Mans 24 Hours* mode: Arcade and Championship. The three playing modes differ mainly in terms of car and tyre wear, the vehicles you may drive (GT2, GT1 or prototype) and how you progress through the ranks.

The game fails to meet the standards of an accurate simulation. The range of setup options is limited, the AI and telemetry are generally poor, and the physics modelling would probably be more at home in games like *Gran Turismo* or *Sega Daytona*. Put simply, these cars are a bit too easy to drive.

This is a game that falls between the cracks. While it is reasonably enjoyable, fans of racing simulations are better served by Electronic Arts' *Sports Car GT*, and it doesn't give arcade racers any reason to shelve *Need for Speed 3*.

Jon Gill

Contact OziSoft
Phone (02) 9666 0100
Online <http://www.lemans-game.com/>
Price \$79.95
Requires Pentium II 233, Windows 95, 32M RAM
Classification G
Rating ★★★

Killer Loop

The futuristic racing genre includes one of the all-time great games; *Wipeout 2097* has a legacy of professional development,



a killer soundtrack and flawless gameplay, making it stiff competition for any new addition to the genre. *Killer Loop* is an unashamed clone of *Wipeout*, and it falls short of its illustrious predecessor in most departments.

Using the familiar premise of an end-of-the-world racing contest, *Killer Loop* sees you in control of various antigravity pods. The goal is to negotiate complex circuits at high speeds, unlocking extra tracks and pods as you progress. Scattered around the tracks are various speed-boosts and weapons power-ups, but the weapons are less than inspiring.

Although speed boosts often push the speed over 500km/h, it doesn't appear that you are going that fast. This is not necessarily a bad thing, as it gives players the opportunity to observe the amazing surrounding scenery. *Killer Loop* provides some of the most beautiful scenarios ever seen in a racing game. Settings varying from the oceans and mountains of Hawaii to the barren landscape of Mars.

However, impressive tracks do not make a game, and many aspects of *Killer Loop* are far from satisfactory. The controls leave much to be desired, swaying from unresponsive to oversensitive. It is almost impossible to produce a smooth, sweeping arc around corners, let alone negotiate the hairpins. Sound effects are also disappointing; engine noise and weapon effects are almost non-existent, and the soundtrack quickly becomes annoying.

Despite its problems, *Killer Loop* has its moments and a quick blast around a track can still be enjoyable. *Killer Loop* lacks the professionalism and refinement of the much older *Wipeout*, which is also far more enjoyable than this clone.

Alan Crawford

Contact Jack of All Games
Phone (02) 9482 3455
Online <http://www.cravegames.com/killerloop/>
Price \$49.95
Requires Pentium 166, Windows 95, 16M RAM
Classification G
Rating ★★☆

Airport Inc

What immediately strikes you about this game is what a great idea it is. The prospect of running your own major airport should whet the appetite of all self-respecting transport tycoons. What a shame it is so poorly executed.

The central goal in *Airport Inc* is to see how much money you can make from the passengers and airlines that use your airport. Your choice of starting city affects the number of airlines that might want to include you in their network, and the more facilities you provide (terminal space, maintenance hangars and so on) the more attractive your airport will become. None of these facilities are free, so the



game revolves around balancing your income from airlines with your expenditure on improvements.

The enjoyable parts of this game include negotiating the flight contracts and watching the planes start to arrive. It's also fun laying out the buildings, roads and runways, and if you are feeling bold, you can even dispense with the prefabricated passenger terminals and try fitting out one yourself — departure lounges, security areas, shops, the whole lot.

The game nosedives because of inadequate information tools. At any particular time, you have little idea what you should be doing next and what the effects of your actions are. The manual is far too brief, and both the tutorial and the on-call expert are too limited.

You are just about flying solo. Trial and error seems to be the best approach, which means there is always an uneasy feeling that you could be doing things a lot better. The interface is not much help either. The graphics are dated and provide very little visual feedback on what is happening with your airport. This is a promising game that fails to take off.

Jon Gill

Contact Jack of All Games
Phone (02) 9482 3455
Online http://www.krisalis.co.uk/softo/airport_inc.htm
Price \$79.95
Requires Pentium II 400, Windows 95, 64M RAM
Classification G
Rating ★★

EMULATORS

**** COMMODORE 64 BASIC V2 ****
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I wanna be just like you ...



There's a definite emulation craze on at the moment. Over the past year, APC has seen (and chortled at) emulators for the Commodore 64, Apple II and even the ancient Hanimex console system. **Alex Kidman** takes an in-depth look at the programs that enable us to enjoy the computing experience of yesteryear without dragging that old system out of your parents' garage.

An emulator is a program that makes one system act and run like a different system. Most commonly, they're used to run programs for that system. Often, they're used to run games for platforms that no longer exist. If you're a young gamer, who never played older games, or never experienced coding on a system with limited output and even more limited memory, the experience of using an emulator will probably be a bemusing one. These emulated systems are archaic, and it shows. If you remember the originals, you can get quite a kick out of going back to games you played as a nipper. It's not quite the same as sitting in front of a TV set, wonky joystick in hand, but it's a pretty good substitute.

You'd be surprised at the number of emulator products out there. Just about every conceivable platform has been emulated, and some emulators boast extremely accurate support. CCS64, for instance, which is a Commodore 64 emulator, can run almost any C64 game you care to try, including cartridge and tape games. Even platforms like the Microbee have been emulated.

Most emulators are written by enthusiasts and distributed freely via download from sites such as the Vintage Gaming Network (<http://vintagegaming.com/>). They're also updated frequently, so keep checking back.

Undoubtedly the most popular form of emulation at the moment is console emulation. Running console games under an emulator usually counts as piracy, especially if the game has been downloaded. The argument put forward by some emulator fans is that it's fair use

to store a backup copy of the cartridge. This practice is legally questionable in Australia, but it is technically permissible under US law.

It doesn't have to be illegal

Reverse engineering (which is how the emulators generally work) is something of a legal minefield, and there are aspects of emulation that are unquestionably illegal. You can't download and use pirated copies of games, no matter what the platform. Some systems require ROM images from the original system, which are usually protected by copyright.

There are formats out there, however, that can be emulated legally. Smith Electronics, owners of the Vectrex copyright, gave carte blanche to such activities some time ago, as did Amstrad, whose line of 8-bit CPC machines were popular back in the 1980s. (Emulators for both these systems are included on this month's cover CD.) However, the games you want to run on these systems may still be protected by copyright.

Some game companies (notably Nintendo, or Namco, which holds the copyright to PacMan) pursue their rights to the fullest extent, although they've been content in the past to simply see offending system images removed from Web pages rather than seeking punitive damages. Other companies are not so fussed. In a lot of cases it appears that, with the merging of companies or their extinction, a lot of software simply falls through the cracks and is forgotten about. The use of many of these reverse-

engineered formats and games is unclear under Australian law.

If we have systems that run at over 500MHz, with 64M of graphics memory and 65G hard drives, why is it so difficult to emulate systems that were produced decades ago with much more basic specs? There are two primary reasons.

First, most emulator writers aren't working from original specs or full access to the design and function of every last chip in a system. Second, even if you overcome this limitation, you need to deal with the mass of software written for the system, much of which exploits gaps in the original OS to begin with (for better effects, snappier music and so on). These systems didn't have much of an upgrade path compared to today's machines, so instead of assuming that you had bought a new processor, the programmers really had to stretch and trick older machines. This then forces the emulators, which are far from perfect copies themselves, to deal with this type of trickery. Often a 'perfect' emulator will be updated specifically so it can run a particular piece of software.

APC has taken a variety of old systems and looked at how they're being emulated on other platforms. This is not a definitive list of emulators — with new emulators being written and old ones being updated all the time, it's almost impossible to keep up.

All of the testing in this review was carried out on Windows/DOS systems. However, many of the emulators discussed in these pages are available for multiple platforms.

Amiga emulators

The primary emulator in the Amiga scene, UAE (Universal Amiga Emulator), refuses to work without a valid image of the Amiga Kickstart ROM. Cloanto has licensed this image, and sells it through its Web site (<http://www.cloanto.com/>), along with a preconfigured UAE pack entitled Amiga Forever. As a completely legitimate and licensed entity, the company is perfectly entitled to distribute this emulator.

The Amiga Forever package includes a utility for transferring files between a PC and the Amiga, which is handy if you do happen to have an Amiga. The rather embarrassing sound sample that squawks 'Amiga Forever' whenever you boot up the application is less impressive. Although the practice is legally questionable, utilities also exist that can extract ROM files from your Amiga and transfer them to your PC for use in emulation. Software you own on the Amiga — including WorkBench — can similarly be transferred.

The Amiga is complex compared to a lot of the other emulated systems APC looked at for this feature, and the Amiga Forever implementation of UAE works well

— we were able to transfer files from an existing machine and run most software. UAE automatically detects hard drive partitions and mounts them as Amiga drives. Floppies are handled slightly differently, mainly because most Amiga games ran from boot, but these are also easy to handle (each disk is represented by a file). You need quite a powerful machine to fully emulate anything more than the most basic A500 machine. The test machine APC used was a Pentium II 350; most software ran at about 80% of the normal speed, and much faster if sound was disabled.

Amiga Forever's support files are among the best APC has seen. If you load with a 3.1 Kickstart image, an onscreen menu guides you through the extras included with the package, as well as a well-written guide to the emulator itself.

Cloanto's Amiga Forever pack comes in two different varieties — a downloadable Windows application for \$US29.95, or a CD-ROM including source code suitable for other platforms for \$US59.95. Although other emulators are free, the stability and ongoing support you get from the Amiga Forever pack make it a worthwhile pur-



chase, especially if you've got a pile of Amiga software going mouldy in a cupboard somewhere.

You can download UAE separately from the Amiga Forever pack (and you can get a more recent version by doing so), although the ROMs and software then have to be obtained by copying them off an existing Amiga. UAE is also available on platforms other than Windows, including Mac, DOS and Linux.

Contact	Cloanto
Online	http://www.cloanto.com/
Price	Downloadable \$US29.95; CD-ROM \$US59.95

Emulation and the law

When Sony sued Connectix over a PlayStation emulator, it was told by the court that Connectix's reverse engineering was considered fair use under US copyright law. However, the jury is still out on whether or not emulators are legal.

Do the developers of game software have a right to force you to use a platform of their choice? Or should you choose which platform you would like to use particular game software on? For instance, if you already have an iMac or the latest PC, you might find it convenient to play your Game Boy, Atari and PlayStation games on your machine rather than buy different hardware for each type of game. Is this legal?

Sony doesn't think so. It recently instructed its US lawyers to commence legal proceedings against companies that have attempted to supply Sony PlayStation console emulators and Web site administrators whose sites contain

downloadable emulators. Sony believes that PlayStation console emulators infringe its legal rights, including its copyright and trademarks.

However, a US Appeals Court recently disagreed with Sony in its case against Connectix (the developer of Virtual Game Station, a Sony PlayStation console emulator for G3 Macintoshes). Sony and Connectix have been fighting for the best part of a year over Connectix's right to reverse engineer the PlayStation BIOS code and make an emulator that enables G3 Mac users to play PlayStation games on their desktop systems, PowerBooks and iMacs.

Round 1

In early 1999, Sony sought an injunction in a US District Court preventing Connectix from supplying its Virtual Game Station to retail outlets in the US. Connectix Virtual Game Station (CVGS) is an

emulator that allows about 100 of more than 500 PlayStation games to run on G3 Mac machines. Sony alleged that the CVGS infringed its copyright because Connectix had reverse engineered the BIOS code (which contains a combination of C source code and R3000 microprocessor assembly language) in the PlayStation console.

During the development of the CVGS, Connectix made many copies of the Sony BIOS in the process of reverse engineering it. This was necessary to obtain information about the unprotected ideas and functions contained in the Sony BIOS.

Connectix pleaded that the reverse engineering it carried out was 'fair use' under US copyright law and therefore legal. The District Court didn't agree. It decided that Connectix had breached Sony's copyright in the BIOS because it had, among other things, repeatedly copied all of the BIOS code and used it to develop a replacement product for the

Amstrad emulators

The Amstrad CPC series of computers targeted the same market as the Commodore 64 and Spectrum computers, and were moderately successful in Australia, especially in South Australia, where they were the official education department computers. There's a strong Amstrad emulation scene, which is largely based in Germany, where the machines were incredibly popular. Amstrad has now abandoned its computer range in favour of home audio systems, and has given a limited release to the original ROMs. As long as a copyright message is included with any written emulators, they can be freely distributed.

There's a wide choice of emulators



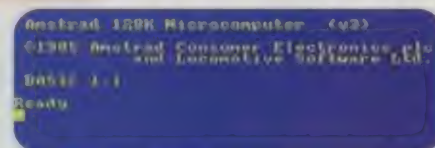
available for the Amstrad CPC range of computers, although most seem to be DOS-based. The Windows-based CaPriCe32 was the most stable of the Amstrad emulators APC looked at. It's the second emulator written by Ulrich Doewich — his first, CPE, was cowritten with Bernd Schmidt, the author of the excellent UAE Amiga emulator reviewed opposite. Like UAE, CaPriCe uses simple text menus for manipulating disk images, saving system snapshots and determining system settings. Ulrich is currently working on some sort of GUI for CaPriCe, which should be a boon, especially for anyone not familiar with Amstrad machines.

Emulation under CaPriCe performed well. A lot of Amstrad software was ported across from the technologically weaker Spectrum range, as the two machines shared the same core processor (a Zilog Z80). Therefore, a lot of Amstrad software doesn't look all that impressive, so unless you loved the originals, you probably won't get much out of Amstrad emulation. Our main gripe with CaPriCe was that the default joystick mapping was very odd indeed; it is based around the Home, End,



Page Down and Delete keys, a combination which isn't that easy to use.

The Amstrad series of computers occupies only a small niche in the overall computer world, so Amstrad emulators are only



likely to appeal to people who once owned an Amstrad. The outreach to people who've never used an Amstrad will be pretty small — they'll more than likely be tempted by other emulators.

PlayStation console. In the District Court's opinion, the substantial copying that Connectix performed in reverse engineering the BIOS code went beyond fair use.

Although Connectix published a disclaimer acknowledging that PlayStation games did not run as well on the CVGS as they do on a PlayStation console, the District Court also decided that the CVGS damaged the PlayStation trademark.

Consequently, the District Court granted an injunction ordering Connectix to stop producing and selling the CVGS. Connectix appealed.

Round 2

On appeal to the US 9th Circuit Court of Appeals, the findings of the District Court were reversed. The Appeal Court found that Connectix's use of the BIOS code was a fair use under US copyright law. "Intermediate copies made and used by Connectix during the course of its reverse engineering of the Sony BIOS were protected fair use, necessary to permit Connectix to make its non-infringing Virtual Game Station function

with PlayStation games," the court wrote.

Further, the Appeal Court ruled that there was no evidence to support the District Court's decision in relation to Sony's trademark infringement claim.



One issue that was not considered by the Appeals Court was Connectix's claim that its use of the BIOS code was protected under section 117 of the US Copyright Act. Section 117 provides that it is not an infringement of copyright for an owner to make copies "created as an essential step in the utilisation of the computer program in conjunction with a machine and that it is used in no other manner".

This defence was successful in the *Aymes v. Bonelli* case. In this case, the plaintiff wrote a number of programs for the defendant between 1980 and 1982. The plaintiff alleged that the defendant infringed his copyright in those programs by making modifications to the programs so that they could run on "successive generations of IBM systems", i.e. different platforms. The court held that to do so was not a breach of copyright under section 117. It is not clear from this case whether US law would allow the adaption of programs to run on any platform as opposed to successive generations of the platform it was designed to run on. US case law would suggest not.

Sony keeps swinging

In another test of Sony's stamina, it has taken Bleem to court alleging that it has infringed its copyright in the Sony BIOS code by developing an emulator. This emulator allows PlayStation games to be played on PCs. Bleem has also reverse engineered the PlayStation BIOS code, albeit in a different way to Connectix.

Apple emulators

Apple is always keen to point out that it launched the home computer revolution (although the Altair actually beat Apple to it), and the machine Apple did it with was the Apple II. Apple II emulators exist in abundance. It shouldn't be a great surprise to find that there's a veritable landslide of Mac-based Apple II emulators — after all, many of the most fanatical Mac users are former Apple II users. Other platforms do get a look in, and emulators for PC and Unix are also freely available. Apple was developing an Apple II emulator for the Mac, to be called Gus, but this project has been abandoned.

Apple released a number of machines under the Apple II moniker, from the



humble Apple II right up to the Apple IIs, and most emulators allow people to switch between system modes — this is important for game emulation, where the extra capabilities (or sometimes lack thereof) can stop things from running.

APC took a look at a Windows-based Apple II emulator, AppleWin. Our main complaint would have to be that it runs in a window, and not full screen, which creates a few image disparities. This, of course, serves as a reminder that it is just an emulator. That minor gripe aside, AppleWin worked well. Virtual disk images (saved in .ADF format) can be inserted and ejected using a control panel on the left-hand side. AppleWin also allows you to overclock your virtual Apple via a slider control — it's certainly the first emulator we've seen with this option.

The usual joystick emulation options are present, but some games — such as Montezuma's Revenge, a classic platformer — failed joystick calibration. One APC writer had to be dragged kicking and screaming away from Aztec, despite his claims that it was "the best game ever written".



In addition to AppleWin, we looked at ApplePC, a DOS-based Apple emulator that can run on a machine with much lower specifications. We could spot that right away, as on our test machine software ran at about 300% of normal speed — thankfully, there's an option to slow down the processor, although you do have to enter it as a hexadecimal value. ApplePC uses the full screen and is fast, although it lacks some of the menu 'shine' of AppleWin, with its simple DOS menu and function keys for things such as colour modes and delays. Once you get the hang of its interface, though, it's quick, will run on just about any system and provides a full screen 'real' Apple experience.

The Connectix decision should assist Bleem's case in their tussle with Sony. "The biggest thing it [the Connectix case] does is set a judicial precedent for us," said Bleem's communications manager, Sean Kauppinen.

Bleem has made a number of counter-claims in these proceedings, including misuse of copyright, patents and other intellectual property. Other claims against Sony include restraint of trade, intentional interference with contractual relations, defamation and unfair competition in relation to Sony's well-publicised efforts to have Bleem's booth removed from the E3 trade event in May 1999. APC will keep you up to date with proceedings as they unfold.

Australian position

If the type of issues that arose in the Connectix case came before an Australian court, it is possible that an emulator developer would have cause for concern. Reverse engineering rights are very difficult to establish under Australian copyright law. It is doubtful whether recent

amendments to the Copyright Act would change this situation.

Under section 47D of the amended act, a person may reverse engineer copies of a program owned by someone else, but only if they intend to make a product that is interoperable with that program (this restriction does not apply under the more flexible 'fair



use' defence under US law). In other words, the right would not be available to Connectix in Australia because the CVGS is not interoperable with the PlayStation console code, but it is a substitute for it.

Fragile arguments could be raised in favour of emulator developers under sec-

tion 47B of the Copyright Act (which is a narrower version of section 117 of US Copyright Act), but these would almost certainly waste a client's time and money because Australian courts have yet to interpret this section. Any interpretation they do give it in the future is bound to favour copyright owners, not those who engage in reverse engineering (as most Australian cases do). Further, any protection that section 47B may provide in this context can legally be excluded by a contrary term or condition in a software licence.

Also, a plaintiff in Sony's position in the Connectix litigation could use both Australian trademark and trade practices law to protect its interests. If the use of an emulator gave consumers the impression that Sony was affiliated with it or authorised, endorsed or licensed the emulator, Sony may be able to protect its rights under these laws. However, if an emulator developer made it clear that there was no affiliation with Sony, it may be difficult for Sony to prevail on this point. Bleem's Web site contains such a disclaimer.

As emulators generally cause games to exhibit some defects (including slower

Commodore 64 emulators

For many people, a Commodore machine provided their first computer experience — and for that reason it should come as no great shock that Commodore machines, specifically the Commodore 64 and the Amiga, are widely emulated across a variety of platforms. One of the best Commodore emulators (and the one that had the most APC journalists huddled around muttering “Cool! Can I have a go?”) is CCS64, which emulates a full screen Commodore 64 with a limited menu interface. It’s actually a little spooky to have a PC screen blink and then come back with the familiar blue screen and **** COMMODORE 64 BASIC V2 **** in large type at the top of the screen. Unlike a lot of other emulators, some serious thought has



gone into the support interface for CCS64. It allows for the dynamic loading of disk or tape images through a simple menu in a very C64-ish font. System speed, joystick settings and sound can be altered. However, unlike a lot of other emulators, there’s no facility to create ‘snapshots’ of a game in progress for later play.

As well as CCS64’s excellent interface, other front ends such as Gamebase64 are available, which sort and list available and workable games.

There’s a reasonable variety of other platforms with their own Commodore emulators: the Mac has Power64, Linux has Vice, and there are quite a few C64 emulators out there for the Amiga.

A lot of Commodore software has been made available free, and APC didn’t find any games that wouldn’t work. Compared with an actual Commodore 64, the main failing was that sound emulation wasn’t quite accurate — it ran at the correct speed, but the tones themselves were slightly off-key from the original. Although it allows you to define joystick keysets, some games wouldn’t respond unless they were told we



were using the keyboard, especially on games that required lots of rapid joystick movement. Games ran at the correct speed, although using the keyboard to simulate joystick responses did sometimes lead to some missed actions. There’s also a large collection of C64 games that relied on joystick waggling for movement, such as the classic ‘Summer/Winter Games’ series, that aren’t really playable with a keyboard.

C64 emulation is strongly centred around gaming and although one APC staffer did amuse himself writing ‘Hello World’ across the screen, the main hook would have to be reliving some of the old gaming classics.

performance speeds, audio and video flaws), it would be prudent for this to be brought to the attention of a prospective consumer prior to purchase. Otherwise, the developer runs the risk of a trade practices action for misleading consumers into thinking that a specific game (or program) would play equally well on both the original platform and the emulator. Both Connectix and Bleem provide disclaimers that clearly inform consumers of this problem.

Impact of patents

Interestingly, Sony did not attempt to challenge Connectix with patent rights in the district or appeals courts. Software patents are much more likely to assist in the protection of the functional aspects of software and may have produced the result Sony was seeking in the Connectix litigation. This was recognised by the Appeals Court in its decision.

So what now?

For a number of reasons, it is too early to determine the effect that the Connectix lit-

igation will have on the development of games emulators in the US.

First, Sony is considering whether or not to appeal the latest decision. A successful appeal would put emulators back on the sidelines.

Second, the court victory for Connectix may not be good for consumers.



Sony believes that it may create a genuine disincentive to large-scale investment in hardware development. “This [Connectix] decision seems to eliminate copyright protection for software that’s embedded in machines,” said James Gilliland, a lawyer for Sony Computer Entertainment. Sony spent over three

years and \$US500 million developing the PlayStation console. It also spent over \$US100 million promoting the console since its release in the US in 1995. “They’ll have to think twice before doing that again if emulator folks can come along with a very minor investment and create competitors this way,” Gilliland said.

In response, Connectix may argue that any revenue losses Sony suffers due to the release of the CVGS are offset by the increased demand for PlayStation titles, because consumers can play titles on the hardware platform of their choice.

In Australia, it would appear that the development of emulators such as the CVGS is not fair play under current laws. “This has serious implications for Australian software developers as they cannot compete in the international market in the same way as their overseas counterparts can,” said Dr Cristina Cifuentes, a leading international computer scientist at the University of Queensland.

A list of useful links on the issues mentioned in this article can be found on this month’s cover CD.

Leif Gamertsfelder

Vectrex

Chances are, you've probably never heard of the Vectrex. It is a unique machine, as it is the only console system to date that uses vector graphics exclusively, so all onscreen components have to be drawn with lines only.

The system itself has no colour support; colour was 'added' later on using coloured plastic overlays that went over the screen. Well, it may have no colour



support, but the Vectrex emulation scene is alive and well. There are even folk out there who still write software for the little black box. John Dondzila has written versions of Asteroids, Q*Bert, Space Invaders and Tetris for the Vectrex (see <http://www.classicgamecreations.com/>), which can either be purchased from him (for those who still happen to have Vectrexes — or is that Vectri?) or downloaded for emulator use.

The two main ways to emulate a Vectrex are through MESS (The Multi Emulator Super System, which emulates a large variety of systems) or a custom system emulator called DVE (Dos Vectrex Emulator). APC looked at DVE, and was impressed with it. Like most emulators, it's still at beta stage, but it is surprisingly robust for a beta. The beta 2.0 version has a reasonable GUI, although the layout is a little odd, as the up and down arrows for scrolling are transposed, and it has a messy text style for reading the included help. Otherwise, there's very little to complain about. Because of its relatively low-tech status, emulation ran at full speed with sound. Simulations of the



plastic overlays can be downloaded and simulated onscreen.

The copyright owners, Smith Electronics, have given free permission for emulation, so even if you haven't tried the Vectrex before, you probably should — the games may be simple, but they're fun, and certainly push the limits of what you can do with simple vector graphics.

Console yourself

There are some legal forms of emulation, at least for the time being. The legal battle surrounding PlayStation emulation has been dealt with, and for the moment it appears that Connectix and Bleem will be allowed to continue selling their products. APC looked at the demo version of Bleem (<http://www.bleem.com/>) to see how it runs in comparison to a real PlayStation. Obviously, the real attraction of consoles — that they can be played on the TV in your lounge room — wasn't present, but on the software side Bleem did reasonably well. The demo only allows for play without a joystick, which makes game control difficult. Not counting the directions, the PlayStation controller has 10 buttons. The emulator was great for testing second-hand software we had just purchased. Bleem doesn't support every game, and if it finds a game which it does not support, it will warn you before launching it.

Irritatingly, if a game did crash, it took the system with it. The demo version doesn't support sound in the games it does recognise, and it failed to recognise



quite a few games. Therefore, we were able to test sound quality of these games. It was acceptable for those things read directly from the CD (ie. CD audio tracks), but less so for those that it expected the PlayStation to generate.

Bleem will set you back \$US29.95 (\$50). Although you do get access to any further upgrades, it's not that much of a jump to a full PlayStation console, which is what we would probably recommend. Bleem is a great example of exactly how far you can push emulation; it is a neat piece of code, but it still needs some work.

Of course, the PlayStation is not the only console platform emulation on the market. Other applications exist for running SNES, NES, Intellivision, Atari, Sega Master System and even Saturn and Nintendo 64 games. Emulators also exist for actual arcade systems, which allow you to run arcade versions of many games. Using any of these products, of course, leaves you open to prosecution, and for that reason, APC doesn't recommend it.

Alex Kidman

Master the art of cooking, learn the lore down-under or teach yourself arithmetic.

Higher learning

MasterCook Food & Wine

MasterCook Food & Wine is both impressive and comprehensive. You work up a thirst and an appetite just reading the equally comprehensive manual.

The program's wine guide includes details and ratings for over 700 wines and you can create and maintain an inventory of your own cellar. The package also comes with a wine journal to record the details of your favourite drop for future reference.

For inspiration in creating your own cookbook, a variety of cookbooks by well-known chefs such as Betty Crocker and Graham Kerr are included. You can also swap recipes with other gourmands at Sierra's Web site.

All levels of expertise in both cooking and computer skills are catered for. For new cooks, there are video tips by experts and an extensive glossary. For computer newbies there is a chapter in the manual explaining computer terms and operations.

The software allows you to search for recipes using a variety of criteria: cuisine, cost per serving, ingredients to use, ingredients to avoid, preparation time and what's in your pantry. The program can also calculate any recipe's nutritional content — a handy feature for people with special dietary needs, such as diabetics.

You can create menus and meal plans and scale the ingredient amounts of existing recipes to the number of servings you nominate. Although the recipe ingredients are in US measurements, it only takes a click to convert them to metric.

There are options that allow you to set out your recipes professionally, and even add pictures and video, and there's a

chapter in the manual detailing how to publish your efforts. You could make use of this feature to give other family members a book of treasured family favourites, or put together inexpensive cookbooks for community group fundraisers.

For a program of this genre, this one has it all.

Gail Lipscombe

Contact	Dataflow
Phone	(02) 9417 9700
Online	http://www.sierrahome.com/cooking/
Price	\$79.95
Requires	Pentium 90, 16M RAM
Rating	★★★★



This all sounds terribly worthy, but Lore of the Land is actually quite interesting and productive. It is not at all your average CD-ROM, and it is well worth investigating if you want to know more about our land over the past few thousand years.

Jeremy Torr

Contact	Fraynetwork
Phone	(03) 9499 9172
Online	http://www.lorefortheland.com.au/
Price	\$90
Requires	Pentium 200, Windows 95, 32M RAM
Rating	★★★★

Lore of the Land

Almost every CD-ROM on the market today follows a logical sequence. You start at the menu, track down through the options, take a few lefts, rights and there you are: at the conclusion.

Just for a change, this CD-ROM doesn't do anything like that. It does offer a menu with basic options at the start, but after that you're on your own. That's because it isn't pretending to supply any particular answers, but is trying to get the user to think about issues.

The subject matter is exactly as stated by the title, Lore of the Land. The land in question is Australia. The lore is pre-settlement culture. The CD is designed to be of interest to those who are intrigued by the relationship between Aboriginal culture and heritage and Australian life.

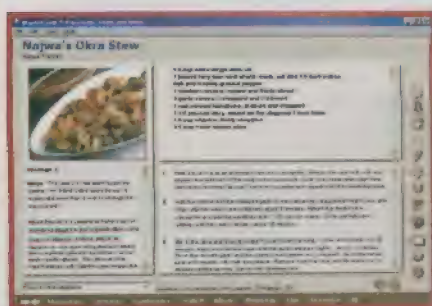
Instead of trotting out the usual 'man with a didgeridoo' images and music, the authors have taken the really unusual tack of asking the user to provide their own answers to a series of questions. These come under general headings such as Discovery, Experiences, Land Issues and Understanding.

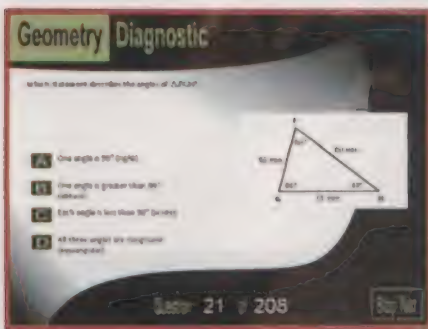
Each area offers a well-thought-out mix of places, people and culture, all related to the Aboriginal experience. There is an incentive to find a series of artefacts as you browse the CD, but the majority of screen space and time are dedicated to your own notes and reflections.

Higher Score High School

As the pendulum swings back in favour of formal testing in Australian schools, you are likely to see more and more test preparation software on shop shelves. At the early learning and primary levels, the content of educational software isn't a problem (basic arithmetic doesn't vary much around the English-speaking world) and Australians tend to be more concerned with cultural sensitivities (eg. 'zed' instead of 'zee').

However, in the secondary sphere, content relevance becomes an issue because of variations in curricula, syllabuses and usage in different places. When looking at Higher Score High School (formerly called High School Success), such considerations are particularly noticeable in the grammar and vocabulary sections. There's nothing wrong with the word 'acclivity', but it doesn't often appear in Australian English. Enclosing the name of a book in double quotes may be the American way, but *The*





Macquarie Dictionary recommends italics or underlining. The algebra and geometry sections are less controversial, but the software should be used with one eye on the relevant syllabus.

The program pre-tests in each of the four major sections to identify weaknesses. Tutorials are delivered in those areas, though they are static and do not take advantage of the potential for dynamic and interactive presentation. Post-tests show whether or not the lessons have been learned. Some tests are lengthy — about 200 questions — but they needn't be completed in one sitting. The voiceover is very corny and is better switched off.

The package also includes six 'bonus' programs: Math Blaster Algebra, Math Blaster Geometry, Grammar Games, Ultimate Word Attack and Ultimate Speed Reader complement the material in Higher Score, while Multimedia Workshop is a relatively simple presentation tool. Higher Score only costs \$10 more than either of the Math Blaster titles alone, so it's a cheap way of acquiring those programs.

Stephen Withers

Contact	Dataflow
Phone	(02) 9417 9710
Online	http://www.knowledgeadventure.com/
Price	\$79.95
Requires	486/66, Windows 95, 16M RAM, soundcard
Rating	★★★

Hemera Photo Objects: Holidays & Festivities

Back in the old days of desktop publishing, you could wince on a daily basis as you read documents embellished with bunches of balloons (party), men in front of computers (work), crayons poised over writing pads (memo) and similar tacky, mono-line artwork.

Now that everyone has a colour printer, some of that has changed. Everything's in colour, but it's still just as tacky. Hemera

Interactive News

● So, you thought set-top boxes were dead? Well, they virtually dead as standalone devices, but lately sales have been on the increase. The digital revolution continues, with the release of a range of digital video recorders in the US (as usual) that have the capability to not only digitally record up to 30 hours of TV, but also work as set-top boxes. Sony, Sharp and Panasonic will have released digital video recorders (DVRs) by the time you read this, as will have EchoStar, a new player in the DVR market. Sony, Sharp and Panasonic's DVRs are basically just large hard drives, but EchoStar's unit will be equipped to receive and record satellite television, and also comes with a modem capable of connecting to the WebTV service. There's no word on a local release yet, because, as we should all be painfully aware, broadband cable access and cable television is still in its comparative infancy.

● Still on set-top box-related news, there's a showdown on its way. Sony's new games console, the PlayStation2, and Sega's Dreamcast system are creating major waves with the existing DVD and set-top box manufacturers. Sony's PlayStation2 will ship with a Dolby Digital 5.1-capable DVD player along with interface ports for video cameras, modems and so on. Sega is rumoured to

be releasing a DVD add-on for the Dreamcast in the future, and the Dreamcast online service has finally been launched. Existing standalone DVD manufacturers in particular are getting a little edgy about Sony's marketing muscle, although all they've managed to come up with so far is a technology called NUON. A NUON-equipped DVD player will, they say, be able to play some rudimentary games and display some psychedelic images when playing music. Golly, that'll surely scare Sony off! Will it even bother to release the PlayStation2 now that NUON is in the works? Somehow I think Sony still might...

● Some more news on cool car technologies which are starting to proliferate. You've probably already seen or heard of the whiz-bang way we'll be driving in the future, but so far it looks as though satellite radio receivers may become the next major enhancement to make it to market. The advantages with satellite are that there's space for hundreds of music channels and you should be able to receive the same station all across our wide brown land. The disadvantages? Lets face it, it'll end up being 100 channels of Backstreet Boys et al. In crystal clear stereo. Aaaaaargh!

Gareth Jones

Photo Objects claims to have taken that jaded 2D clip art concept and made it exciting; it even bills its product as the next generation of clip art. That's good.

What it has done is take all those clip art standards (man at desk, kid with bicycle, doctor with clipboard, baby in cot) and photograph them instead of draw them. So the clip art you can now use is much more realistic — because it is photographic.

Hemera has also thoughtfully taken away the backgrounds from their photo-

graphic subjects, which means you won't be distracted by anything lifelike if you use them. If you want spot-on and totally realistic images of the Hanukkah, a bunch of balloons with 'happy birthday' on them and that old clip art favourite, the American school bus, then the Hemera Photo Objects Holidays & Festivities Collection is the clip art collection for you.

If you are heartily sick of all those numbingly repetitious clip art images — even the photo versions — and see them as the scourge of good design on the desktop, you might want to pass it by. The choice is yours.

Jeremy Torr



Contact	Marketing Results
Phone	(02) 9899 5888
Online	http://www.hemera.com/
Price	\$29.95
Requires	486, Windows 95, 8M RAM
Rating	★★

It's not easy being a wage slave
in a software empire.

Turning to the dark side

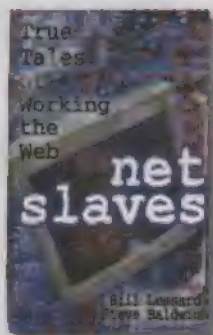
NetSlaves

Once upon a time, very few books spawned Web sites of their own. A publishing company may have set up a Web site based on a book to promote it to the Internet community, keeping the printed text up to date, linking to related resources, or even allowing readers to communicate with the authors and each other. Now it seems the reverse is true, and Web sites are beginning to spawn books of their own in the form of 'best of' collections such as *Suck: Worst-case Scenarios in Media, Culture, Advertising and the Internet*. The most recent of these books is *NetSlaves: True Tales of Working the Web*, which started as an online forum for the disgruntled workers of Silicon Alley to vent their frustrations, and is now available in dead tree format.

The editors of *NetSlaves* have not simply bundled up the best of these stories. Lessard and Baldwin have described a 'caste system' which operates in new media companies, and each chapter tells a story about a character from one of these castes. In some cases, the editors have cobbled together the stories of several people into one, and the results often read more like a chapter of William Gibson's *Virtual Light* than realistic accounts of work in an Internet business.

A quiz at the beginning of the book helps you identify your own 'caste' and there are 10 levels, ranging from "garbagemen" (meaning support staff) to "robber barons" (CEOs), and a sub-level of "mole people" (GeoCities home-steaders). In between, there are social workers, cab drivers, gold diggers, priests, robots and more.

According to *NetSlaves*, low-level members of this caste system dream the Great American Dream of moving up through the system until they themselves become rich, famous or powerful, but many of them just end up burning out. Not all of the stories in *NetSlaves* are about late nights with no overtime and too many cans of Jolt Cola; some of the characters do move up the corporate ladder. However, these success stories usually turn



sour as well, and the 'lucky ones' end up sliding sideways into a position at another new media company.

This book isn't a self-help guide to making it big in the dot com economy, but a warning that there are fewer successes in new media than we have been led to believe. Jobs in new media aren't that different to jobs in traditional industries, except that there

are no trade unions to call on — if you're in trouble, you're on your own. A sobering counterpoint to the current wave of hype about technology stocks and ecommerce.

Glenn Phillips

Editors	Bill Lessard and Steve Baldwin
Publisher	McGraw-Hill
Contact	McGraw-Hill
Phone	(02) 9415 9899
Price	\$39.95
ISBN	0-07-135243-0
Rating	★★★

The Software Conspiracy

The messages in this book are about as glib as you'll get. It suggests that consumers are exposed to the unscrupulous, greedy and arrogant behaviour of software companies that claim it's impossible to write software without bugs. US journalist Mark Minasi takes his bugbear public in this book, and zealously explodes the myths and explains what can be done to combat the situation.

Minasi claims a staggering 90% of bugs reported by users were known to the software makers prior to shipment. He calls for people to take a stand, and demonstrate to the industry that it's not a case of 'if we build it, they will come'. The simple solution, he suggests, is to "tell software vendors [we] won't accept garbage", think twice about upgrading software and return a product if you find unacceptable bugs. He claims that software businesses will only continue to produce buggy software if consumers keep

buying it. Unfortunately, his advice is far from practical. First, it's unlikely that writing to Microsoft, Lotus or Netscape will reduce bugs to zero. Second, the majority of software products are not forward compatible, which means most people are left with little choice but to upgrade if they exchange files with others. Finally, Minasi obviously hasn't tried to return software that has been opened, installed and used.

The interesting (but largely unrelated) issue of software and the law occupies nearly a quarter of the book. It is clearly one of the author's passions, and while he fails to adequately relate it back to the issue of bugs, he nevertheless exposes draconian software licensing rules. For instance, you can have a copy of Microsoft Office 95 on your work computer, and on either your home computer or laptop, but not on both. Office 97 only allows you to install the software on a laptop in addition to your work PC. You cannot install it on a home PC as a second copy. An earlier version, Office 4.2, allowed you to install a copy on all three computers.

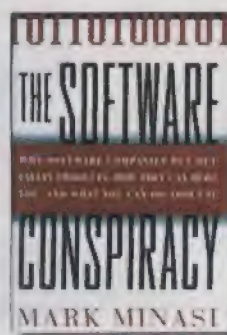
Minasi's other *idée fixe* is the relationship between exports and the US economy. It's a topic about which he is passionate, and he shows signs of his xenophobia in the chapter entitled 'Bugs and the Country'.

He writes: "A dollar sent overseas can become the means by which people from overseas come to own everything it the

US, including land, which means they'll be our landlords; or businesses, meaning they'll be our bosses."

Outrageous statements and a few interesting revelations aside, this book struggles to keep your interest. It had the potential to take the lid off the software industry; however, it falls considerably short of expectation.

Cathie Kennedy



Author	Mark Minasi
Publisher	McGraw-Hill
Contact	McGraw Hill
Phone	(02) 9415 9899
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ISBN	0-070134806-9
Rating	★★☆

Sweeping the cobwebs

The Web has changed since APC first started reviewing Web sites in 1996 — there are new media formats, faster connections and more people using it. Have our favourite sites changed as well?

JenniCam

It is estimated that over 60% of the world's TV viewers tuned in to watch Armstrong take his small step in 1969. Almost every Australian with a TV watched Bruce Gynell welcome them to television in 1956. And just about every male geek with a modem logged in to watch Jennifer Ringley get it off (and then get it on) at her JenniCam site in 1996. Even more did so in



1997, when APC ran a review of the site, a move which angered Ringley and led to a vitriolic if not especially productive exchange of emails.

Jennifer's site started as a small, semi-private look-see into her life, but once it caught on, Jenni smelled cold, hard cash and transformed herself into a one-woman voyeuristic enterprise.

It's not hard to find nudity online. There are US college boys trying to pay for their education by doing a Jenni (well, the male equivalent), and there are Jenni clones. And, of course, there's still Jenni, still getting it off, getting it on, and boring everyone senseless in between.

The fact is that Jenni is quite ordinary in that she might spend a lot of time *thinking* about sex, but she only spends a small percentage of her time actually doing it. Her viewers aren't logging in to watch Jenni brush her hair.

Josh Gliddon

Online <http://www.jennicam.org/>
Rating ★★★★★

Disinformation

Is Tupac Shakur the Elvis of the '90s? Was he really shot and killed while cruising in Las Vegas, or did he fake his own death so he could later return and form a new political party? These are the kinds of questions raised by Disinformation — but rather than answer them, it provides 'dossiers' on ideas such as this, and links to other Web sites where you can find out more and perhaps answer the question yourself. The dossiers fall within sections with titles such as The Conspiracy, Orgasmatron and Police State.

When APC last reviewed Disinformation in July 1998, it was criticised for its US-centric approach. An Australian, Alex Burns, has since become the editor of Disinformation, and subsequently there is plenty of coverage of Australian issues. At the time of review, there was a dossier on mandatory sentencing in the Northern Territory and Western Australia.

Also new to Disinformation is an expanded Headshop, where you can buy



books by writers such as Kathy Acker, J G Ballard and Noam Chomsky, or a Disinformation compilation of early electronic music called *Best of Moog*. The Sub-Culture Search Engine is still there, indexing the non-commercial side of the Web, and if you're a Mac user you can now download a plug-in for Sherlock.

Glenn Phillips

Online <http://www.disinformation.com/>
Rating ★★★★★

BBC News

The BBC's news site was redesigned last year, and is now a little harder to navigate, but it is still one of the most in-depth and informative news services available.

Its best feature is its impressive presentation of background information. Every report on a major world issue — East Timor and Northern Ireland in recent



weeks — is accompanied by links to articles outlining the history of each issue, and these are continually updated. For instance, if you click on the latest Kosovo story, you will find a link to the Kosovo Special Report page. Here you can look up a whole history — not just of the area, but of the war itself as it unfolded.

Even if the area you're interested in isn't currently in the news, you can enter a keyword in the site's search facility to find the last reference, and go from there. If you want to understand the stories behind the news, you can't do better than this.

Lindsay Hayman

Online <http://news.bbc.co.uk/>
Rating ★★★★★

The Lab

Although many of the subjects are presented in a serious vein, there is heaps of fun to be had on this site. Potentially dry topics are given wide appeal by the ABC's wacky science trio: Dr Karl Kruszelnicki, Bernie Hobbs and Paul Willis.

There are pages devoted to issues such as the environment, health, astronomy and birdwatching. You can also keep up-to-date with a page on what's coming up in science on ABC radio and TV, and an events calendar for what's happening science-wise around the country. It has an exhaustive (and exhausting) list of links to other relevant sites, covering just about any scientific angle you could think of.

The site showcases an ABC science feature; for this review, it was the four-part 'Descent of Man' series from Radio National's *Science Show*. You can view relevant background information, read the transcripts of the episodes, or choose the audio option. You can also participate in a live forum on the series.



Like the last person to review this site for APC, visiting The Lab has erased all my high school nightmares of learning the periodic table and physics formulas, and made science what it should be — accessible, fascinating and fun.

Gail Lipscombe

Online <http://www.abc.net.au/science/>
Rating ★★★★★

Salon

Pretentious? Moi? Salon is an ezine that poses as a hip and happening model of the historical concept of the salon — a meeting place for the elite of politics, fashion and the arts.

The site covers an incredibly wide range of subjects including politics, social issues, health, leisure, arts and entertainment. However, it can be quite condescending. Take, for instance, the section called Mothers Who Think. Obviously, this is for the mother who is intellectually a cut above all those brain-dead mothers out there.

There is plenty of scope for reader interaction on this ezine; its Table Talk section allows you to participate in debates on just about anything. Its forums cover over 30 broad subject areas, and there are opportu-



nities to vote on any number of topical questions. You are also invited to send in your celebrity gossip and scuttlebutt to showbiz/celebrity/gossip columnist Amy Reiter.

The site has a US focus, particularly on the subject of politics, but a search using Australia as the keyword produced 400 references. Many of these links were relatively tenuous, but Australian travel and profiles of notable Australians were well represented. Australia's new Net censorship laws are covered extensively.

In 1998, APC found Salon to be chock-a-block with interesting reading and well worth a visit, and this is still the case. However, as a modern incarnation of the lofty ideals of the popular 17th and 18th century tradition, it has delusions of adequacy.

Gail Lipscombe

Online <http://www.salon.com/>
Rating ★★★★★

Scientology

Long before the massive explosion in e-commerce hype, Scientologists realised the Net's potential for not just disseminating information to a previously unreachable audience, but for making money. This site's overriding theme is selling Scientology and the book *What is Scientology?*, which will apparently answer all your questions about this "applied religious philosophy".

The site employs a mixed bag of telemarketing sales tools to convince you that Scientology can change your life. The first is a page of testimonials from successful businessmen, doctors and former drug addicts who have



been transformed into healthier, happier, less dysfunctional individuals by reading the aforementioned book.

Another link claims to connect you with "over 15,000 Scientologists online!". This isn't a chat community, but a list of roughly 15,000 church members' Web sites. This may seem impressive, but the sites are all more or less identical. You cannot communicate directly with members, but you can get in touch with them by completing a form with all your contact details. A more interactive feature is the inevitable 200-question personality test.

Nola Camden

Online <http://www.scientology.org/>
Rating ★★★★★

The '80s Server

Bad music, dodgy hair and just plain ridiculous clothes — that's what I remember about the '80s. But there was a lot more and The '80s Server is the one-stop shop for remembering more than what is considered healthy about the decade of dagginess.

Not many other sites list every television show broadcast on US TV between 1980 and 1989. Or have sections devoted to '80s sports and movies, or even quizzes to test your knowledge against other online '80s freaks.

The most annoying thing about this site is the fact that you have to be a member to



access most of it. No matter how great the '80s were, I'm not willing to fork out my hard-earned money to reminisce about Wham!, Culture Club and *Ghostbusters*.

The '80s Server is a nifty little site to remind you of the good ol' days. The highlight is Valley URL, which can translate a site into ValSpeak (even the error messages conform: "Like, I'm totally sorry, but there totally isn't anything at this URL"). It's even better if you can find a site that the Valley translator is compatible with.

Laura Kane

Online <http://www.80s.com/>
Rating ★★★★★

Chip Chat

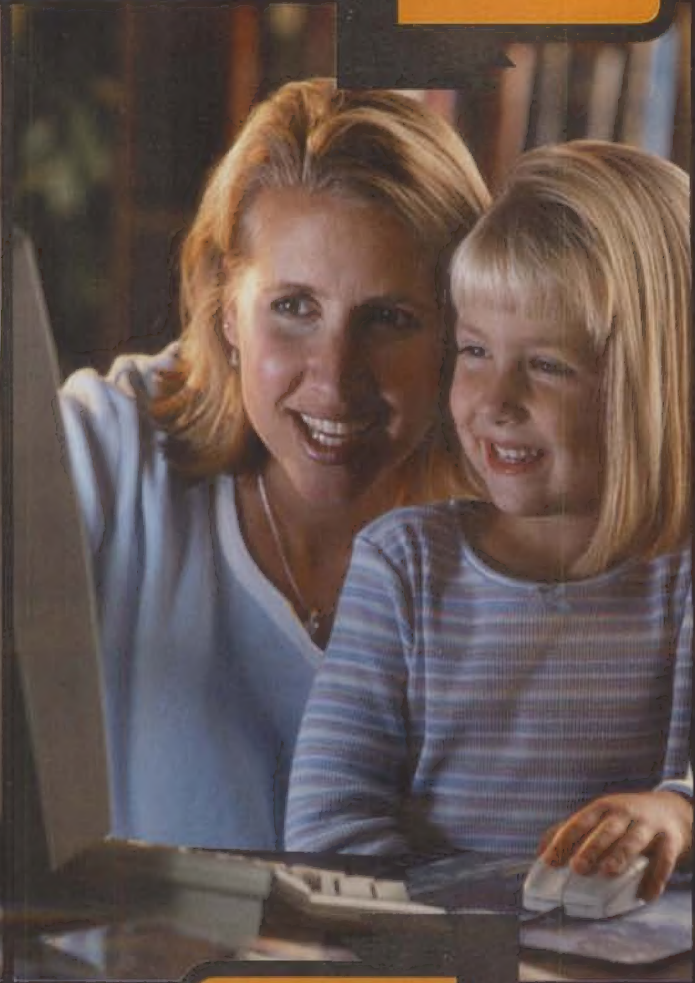
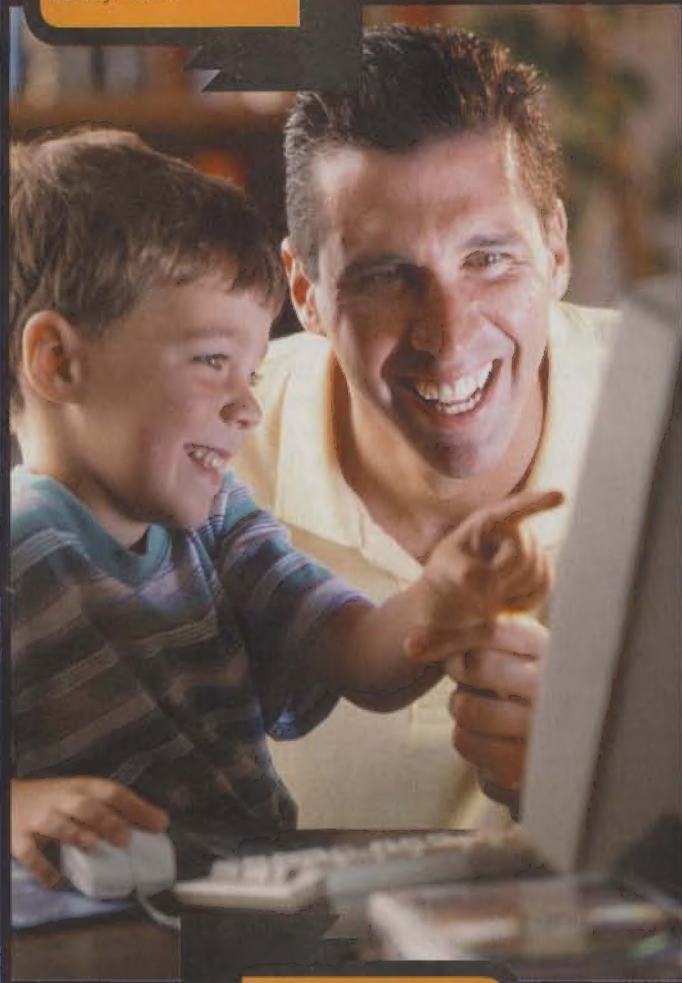
This may look like a simple, innocent shot of happy family members enjoying themselves around a newly acquired lounge room PC.

But what darker secrets does it hide?

Only Chip Chat dares to reveal the truth . . .

Steve, aged 32, has this expression of fixed awe on his face to conceal two facts: (1) he has no idea why his son Kevin is so excited; (2) after reading what appeared to be comments about his wife in a Net chat room, he's no longer sure that Kevin is actually his son.

Myrna, aged 31, works as a Windows NT systems administrator, so it's a minor miracle that she looks this relaxed. The strain is evident in the fact that she has accidentally copied her daughter's haircut.



Kevin, aged 6, is pretending to be enthralled with Dr Seuss Kindergarten Deluxe, but it's all a sham. He really wants the Net economy to collapse, so dad will give up online trading and Kevin can spend more time kicking butt in EverQuest.

Tina, aged 4, is a Barbie girl in a Barbie world. Life in plastic is fantastic, apparently. Rumours that she will grow up to be Britney Spears could not be confirmed at the time APC went to press.



If you can imagine it, it's on eBay.

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